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United States
Department of
Agriculture

Prepared by:
Office of Grants
and Program Systems

Food and Agriculture Competitively Awarded Research and Education Grants

Fiscal Year 1984

U.S. DEPARTMENT OF AGRICULTURE
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FOOD AND AGRICULTURE
COMPETITIVELY AWARDED
RESEARCH AND EDUCATION
GRANTS

Fiscal Year 1984

UNITED STATES
DEPARTMENT OF
AGRICULTURE

PREPARED BY:
OFFICE OF GRANTS
AND PROGRAM SYSTEMS
SCIENCE AND EDUCATION

DECEMBER 1984

FOREWORD

Our country has an excellent State-Federal agricultural and forestry research partnership that has helped develop an agricultural research system that is envied the world over. The ability of our agriculture to produce efficiently and meet each new need is the result of the support of this strong, stable research system. It provides the continuing research base with the resources and continuity necessary for scientific advances on the many fronts involved in modern-day agriculture.

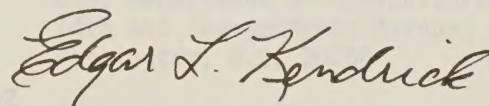
The grants reported in this publication represent still another aspect of this research system--the Competitive, Special, Alcohol Fuels, and Small Business Innovation Research grants programs as well as the Food and Agricultural Sciences National Needs Graduate Fellowships grant program. Collectively, the focus is primarily on basic research or education to discover the information needed before we can make further important and necessary breakthroughs in our applied research programs.

Qualified scientists both inside and outside the traditional agricultural research system apply for and receive these grants. Thus, not only scientists from the Federal laboratories, the State agricultural experiment stations, the schools of forestry, the 1890 universities and Tuskegee Institute, and the colleges of veterinary medicine, but qualified scientists from various other organizations, both public and private, participate in the programs.

The primary aim of the mission-oriented basic research program is discovering new information needed to further significant progress in the plant sciences--photosynthesis, biological nitrogen fixation, genetic mechanisms, and biological stress--and in human nutrition. Other areas supported by grant programs include animal health, aquaculture, soybean, and alcohol fuels research as well as food and agricultural sciences areas suitable for graduate work and small business participation.

During the Fiscal Year October 1, 1983, through September 30, 1984, competitive grants totaling \$58,924,682 were awarded to fund projects at 131 institutions or organizations.

It is our belief that out of this combination of a sound, stable ongoing research system, with a viable extramural grants program to attack significant and difficult problems in agricultural science, comes the information and knowledge necessary to keep our U.S. agriculture strong and resilient--ready and able to meet any challenge that might be ahead.



EDGAR L. KENDRICK
Administrator
Office of Grants and Program Systems

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This publication was prepared by the Grants Administrative Management staff, Office of Grants and Program Systems, Science and Education, USDA.

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FOOD AND AGRICULTURE
COMPETITIVELY AWARDED
RESEARCH AND EDUCATION
GRANTS

Fiscal Year 1984

THE GRANTS PROGRAMS

The research grants programs of science and education under which the competitive selection process was used during Fiscal Year 1984 were:

1. Competitive Research Grants Program to support basic research in the food and agricultural sciences;
2. Special Research Grants Program to support research deemed by Congress and the Department of Agriculture to be of particular importance to the Nation;
3. Alcohol Fuels Research Grants Program to support energy-related research.

These sources of funding supplement and complement funding of Federal agricultural research and the basic State research institution formula funding by Congress to help maintain a viable, effective, ongoing State-Federal agricultural research capability for this country.

In addition, grants were awarded competitively for the following programs:

4. Food and Agricultural Sciences National Needs Graduate Fellowships Grants Program to develop professional and scientific expertise in the food and agricultural sciences.

5. Small Business Innovation Research Program, a primary aim of which is to stimulate technological innovation in the private sector.

Grant funds for all of the above programs are administered through the Office of Grants and Program Systems.

Guidelines for grants to be awarded competitively are published annually in the Federal Register, usually near the end of each calendar year. The guidelines identify selected research areas, the amount of funding, and requirements for the submission of proposals.

Single copies of or annual semiannual subscriptions for the Federal Register are available for a small charge from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

If you want further information on programmatic aspects of these grants, contact:

Dr. Edgar L. Kendrick
Administrator
Office of Grants and Program Systems
U.S. Department of Agriculture
14th and Independence Avenue, S.W.
Washington, D.C. 20250

If you want information on administrative aspects of these grants, contact:

Mr. Terry J. Pacovsky
Chief
Grants Administrative Management
Office of Grants and Program Systems
U.S. Department of Agriculture
15th and Independence Avenue, S.W.
Washington, D.C. 20251

COMPETITIVE RESEARCH GRANTS PROGRAM

The grants awarded in this program concentrate in the plant biology and human nutrition areas. These two areas were selected because many scientific groups consider them to offer exceptional opportunity for fundamental scientific discovery. Research in these areas, in the long run, should contribute to applied research and development vitally needed for solving important food and nutrition problems. There is a need for innovative approaches and enhanced levels of funding to find ways to increase food production and improve human nutrition.

The following tabulation lists the funds awarded in the various areas in FY 1984 under the Competitive Research Grants Program.

Plant biology	\$14,454,700
Biological nitrogen fixation	\$3,078,958
Biological stress on plants	4,241,138
Genetic mechanisms for crop improvement	4,054,720
Photosynthesis	3,079,884
Human requirements for nutrients	\$ 1,924,360
TOTAL	\$16,379,060

This program is administered under the authority of Section 2(b) of P.L. 89-106, 7 U.S.C. 450i(b), as amended by Section 1414(b) of P.L. 95-113 and Section 1415(a) of P.L. 97-98, and in accordance with Sections 6301-6308 of P.L. 97-258.

U.S. colleges and universities, other research institutions and organizations, Federal agencies, private organizations or corporations, and individuals may submit proposals.

Plant Biology

Grants were awarded in four areas of research in plant biology: Biological nitrogen fixation, biological stress on plants, genetic mechanisms for crop improvement, and photosynthesis. A brief description of each area of research follow with a listing of research grants made during FY 1984.

Biological Nitrogen Fixation

Grants in this area support research to find ways to naturally increase the nitrogen available to plants. Lack of nitrogen for plant growth is the most common limiting factor in crop agriculture. This research will contribute to understanding nitrogen-fixing mechanisms in both symbiotic and free-living organisms, as well as the fate of fixed nitrogen.

The objective of this research is to build a foundation of basic information concerning nitrogen fixation. This information should help us enhance the process in currently known systems and provide a base for developing new nitrogen-fixing associations--by genetic transfer or other means--for crop species not now possessing such capability.

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: BIOLOGICAL NITROGEN FIXATION

GRANTS AWARDED FOR FISCAL YEAR 1984

ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT FROM	PERIOD TO	TITLE
Univ. of Arizona Tucson, Arizona 85721	John Enemark	\$120,000	09/01/84	08/31/86	⁹⁵ Mo NMR as a Probe of Molybdenum Centers
Univ. of California Berkeley, California 94720	E. Paul	\$80,000	09/01/84	08/31/86	The Control of Symbiotic N ₂ Fixation by Carbon-Phosphorus Interactions
Univ. of California Davis, California 95616	Donald Munns	\$60,000	09/15/84	09/30/86	Failure of <u>Phaseolus vulgaris</u> to Sustain N ₂ Fixation in the Field
Univ. of California Davis, California 95616	John Ingraham	\$60,000	07/01/84	06/30/85	Physiological Genetics of Denitrification: A Route to Conserving Fixed Nitrogen
Univ. of California Irvine, California 92717	Barbara Burgess	\$70,000**	**06/01/84	**08/31/85	Nitrogenase Reactivity: Relevance to Molecular Mechanisms and Cellular Physiology
Univ. of Southern California Los Angeles, Calif. 90089	Charles McKenna	\$80,000**	**08/15/82	**08/31/86	ATP Site of Nitrogenase

**AMENDMENT

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: BIOLOGICAL NITROGEN FIXATION

GRANTS AWARDED FOR FISCAL YEAR 1984

ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT FROM	PERIOD TO	TITLE
Univ. of California Riverside, California 92521	Daniel Arp	\$85,000	08/01/84	07/31/86	H ₂ Inhibition of N ₂ Reduction: The Role of Hydrogenase
Univ. of South Florida Tampa, Florida 33620	M. Barber	\$90,000	09/01/84	08/31/86	Topological and Mechanistic Analysis of Assimilatory Nitrate Reductase
USDA-ARS-South Atlantic Area Richard B. Russell Agric. Res. Center P.O. Box 5677 Athens, Georgia 30613	Paul Bishop	\$100,000	07/15/84	07/31/86	Nitrogen Fixation by <u>Azotobacter vinelandii</u> Under Molybdenum- Deficient Conditions
Univ. of Chicago Chicago, Illinois 60637	Robert Haselkorn	\$70,000	08/01/84	07/31/85	Nitrogen Fixation in Blue-Green Algae (Cyanobacteria)
Iowa State Univ. of Science & Technology Ames, Iowa 50011	John Bremner	\$80,000	06/15/84	06/30/86	Agricultural Significance of Rhizobial Denitrification
Kansas State Univ. Manhattan, Kansas 66506	Peter Wong	\$100,000**	**08/01/82	**07/31/86	Elucidating the Mechanism of <u>Legume-Rhizobium</u> Compatibility

**AMENDMENT

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: BIOLOGICAL NITROGEN FIXATION

GRANTS AWARDED FOR FISCAL YEAR 1984

ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Univ. of Maine Orono, Maine 04469	C. Schwintzer	\$90,000	08/01/84 07/31/86	The Ecology of Nitrogen Fixation in Actinorhizal Plants
Johns Hopkins Univ. Baltimore, Maryland 21218	Robert Maier	\$110,000	07/15/84 07/31/86	Characterization of the Hydrogen Oxidation System in <u>Rhizobium</u> <u>japonicum</u>
Northeastern Univ. Boston, Massachusetts 02115	Kostia Bergman	\$60,000**	**08/01/83 **07/31/85	Motility and Chemotaxis in <u>Rhizobium meliloti</u>
Massachusetts Inst. of Technology Cambridge, Massachusetts 02139	E. Signer	\$100,000	09/01/84 08/31/86	Genetics of Nodulation in Rhizobium-Dicarboxylic Acid Transport
Massachusetts Inst. of Technology Cambridge, Massachusetts 02139	W. Orme-Johnson	\$85,000	06/15/84 06/30/85	Biochemical and Genetic Approaches to the Characterization of <u>nif</u> Gene Products
Univ. of Minnesota St. Paul, Minnesota 55104	Edwin Schmidt	\$90,000	07/01/84 06/30/86	Bases for Success of <u>Rhizobium</u> <u>japonicum</u> Serogroup 123 in Nodule Occupancy
Univ. of Minnesota St. Paul, Minnesota 55104	Alan Hooper	\$115,000**	**09/01/82 **08/31/86	Mechanism of Production of Nitrite and Nitrous Oxide by <u>Nitrosomonas</u>

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COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: BIOLOGICAL NITROGEN FIXATION

GRANTS AWARDED FOR FISCAL YEAR 1984

ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT FROM	PERIOD TO	TITLE
Univ. of Minnesota St. Paul, Minnesota 55104	James Howard	\$120,000**	**09/01/82	**08/31/86	Structure-Function of Fe Protein
Univ. of Missouri Columbia, Missouri 65211	David Emerich	\$45,000	09/01/84	08/31/85	Nitrogen Fixation: Energy Generation via Hydroxybutyrate and Organic Acid Metabolism
Univ. of Missouri Columbia, Missouri 65211	Judy Wall	\$45,000	09/15/84	09/30/85	Nitrogen Metabolism and Nitrogen Fixation of <u>Rhodopseudomonas</u> <u>capsulata</u>
Washington Univ. St. Louis, Missouri 63130	Georgia Shearer	\$90,000	07/01/84	06/30/86	Isotopic Fractionation as a Probe of the Mechanism of Denitrification
Agric. Expt. Station Univ. of Nebraska Lincoln, Nebraska 68583	Robert Klucas	\$100,000	08/01/84	07/31/86	Factors Affecting Functional Leghemoglobin in Legume Nodules
Boyce Thompson Inst. for Plant Research Tower Road Ithaca, New York 14853	Thomas LaRue	\$18,000**	**08/01/83	**07/31/85	Host Plant Genetics and Nodule Formation

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COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: BIOLOGICAL NITROGEN FIXATION

GRANTS AWARDED FOR FISCAL YEAR 1984

ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT FROM	PERIOD TO	TITLE
Battelle Memorial Institute 505 King Avenue Columbus, Ohio 43201	W. Evans	\$40,958	09/01/84	08/31/85	Mechanisms Involved in the Export and Import of NH_4^+ in <u>Rhizobium</u>
Battelle Memorial Institute 505 King Avenue Columbus, Ohio 43201	W. Bauer	\$90,000	08/01/84	07/31/86	Mechanisms by Which Soybean Plants Optimize Infection and Nodulation by <u>Rhizobium</u>
Battelle Memorial Institute 505 King Avenue Columbus, Ohio 43201	Gerald Watt	\$110,000	09/01/84	08/31/86	The Mechanism and Energetics of Biological Nitrogen Fixation
Battelle Memorial Institute Columbus, Ohio 43201	D. Dean	\$60,000	09/15/84	09/30/85	Genetic Organization and Physiological Expression of Structural Genes for Nitrogenase from <u>Azotobacter vinelandii</u>
Battelle Memorial Institute 505 King Avenue Columbus, Ohio 43201	D. Keister	\$45,000	08/01/84	07/31/85	Physiology and Control of Exopolysaccharide Synthesis in <u>Rhizobium japonicum</u>

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: BIOLOGICAL NITROGEN FIXATION

GRANTS AWARDED FOR FISCAL YEAR 1984

ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT FROM	PERIOD TO	TITLE
Battelle Memorial Institute 505 King Avenue Columbus, Ohio 43201	G. Peters	\$65,000	09/15/84	09/30/85	The <u>Azolla anabaena</u> Symbiosis: Form and Function
Ohio State Univ. Res. Fdn. Columbus, Ohio 43212	J. Streeter	\$100,000	09/01/84	08/31/86	Inhibition of N ₂ -Fixing Activity of Legume Nodules by Nitrate
Univ. of Tennessee Knoxville, Tennessee 37996	Gary Stacey	\$90,000	09/01/84	08/31/86	Host Recognition in the Nitrogen- Fixing <u>Rhizobium japonicum</u> - Soybean Symbiosis
Virginia Polytechnic Inst. & State Univ. Blacksburg, Virginia 24061	John Johnson	\$100,000	08/01/84	07/31/86	Nitrogenase Structural Genes in <u>Clostridium</u> and <u>Azospirillum</u>
Univ. of Virginia Charlottesville, Virginia 22906	Bruce Averill	\$95,000**	**09/01/82	**08/31/86	Models for the Metal Cofactors of Nitrogenase: Potential N ₂ Fixation Catalysts

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COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: BIOLOGICAL NITROGEN FIXATION

GRANTS AWARDED FOR FISCAL YEAR 1984

ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Washington State Univ. Pullman, Washington 99164	M. Kahn	\$120,000	08/01/84 07/31/86	Genetics of Ammonia Assimilation in <u>Rhizobium meliloti</u>
Univ. of Wisconsin Madison, Wisconsin 53706	Jerald Ensign	\$100,000	09/01/84 08/31/86	Role of Vesicle Organelle in Nitrogen Fixation by <u>Frankia</u>

TOTAL \$3,078,958

Biological Stress on Plants

Research grants in this area support studies on stresses on plants arising from their interactions with other plants or with other biological agents such as weeds, insects, nematodes, fungi, bacteria, viruses, and mycoplasma-like organisms. The ultimate goal is to reduce losses in plant productivity from damage caused by biologically generated stresses.

Emphasis in this area is on studies that will enhance understanding of how stressful interactions are established between plants and other biological agents; how such interactions are influenced by environmental and other factors inherent to the interacting organisms; how the interactions reduce plant productivity and usefulness to man; how plants react to stress generated by such interactions; and how damage from such interactions may be reduced or eliminated.

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: BIOLOGICAL STRESS ON PLANTS

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ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Auburn Univ. Auburn Univ., Alabama 36849	E. Curl	\$95,000**	**09/15/82**09/30/86	Potential of Mycophagous Insects for Control of Plant Disease
Northern Arizona Univ. Flagstaff, Arizona 86011	Thomas Whitham	\$40,000	07/15/84 07/31/85	The Interaction of Environ- mental Stress and Herbivory on Pinyon Pine, <u>Pinus edulis</u>
Univ. of Arizona Tucson, Arizona 85721	Michael McClure	\$50,000	07/01/84 06/30/85	Isolation and Characterization of Stylet Exudate from Root- knot Nematodes
Univ. of Arkansas Fayetteville, Arkansas 72701	Robert Robbins	\$80,000	09/01/84 08/31/86	Biological Comparisons of Morphological Variants Comprising <u>Xiphinema</u> <u>americanum sensu lato</u>
Univ. of California Berkeley, California 94720	Steven Lindow	\$90,000	07/15/84 07/31/86	Characterization of Ice Nucleation Active Bacterial Proteins Causing Plant Frost Injury
Univ. of California Berkeley, California 94720	M. Hoy	\$70,000	09/01/84 08/31/87	Genetic Improvement of Natural Enemies: Selection for Resistance to Pesticides in <u>Aphytis</u>

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COMPETITIVE RESEARCH GRANTS PROGRAM
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ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT FROM	PERIOD TO	TITLE
Univ. of California Berkeley, California 94720	Brian Staskawicz	\$90,000	08/01/84	07/31/86	Molecular Analysis of Avirulence Genes in <u>Pseudomonas syringae</u> pv. <u>glycinea</u>
Univ. of California Berkeley, California 94720	N. Panopoulos	\$3,000	08/15/84	02/28/85	Genes for Virulence, HR, Toxi- genesis and Toxin Immunity in <u>P.</u> <u>syringae</u> Pathovars
Univ. of California Davis, California 95616	W. Timberlake	\$50,000	09/01/84	08/31/85	Development of Molecular Cloning Vectors for Filamentous Fungi
Univ. of California Davis, California 95616	Hugh Dingle	\$80,000	08/15/84	08/31/87	Clonal and Environmental Variation in Aphid Life Histories
Univ. of California Davis, California 95616	George Bruening	\$50,000	09/15/84	09/30/85	Antiviral Action of Satellite RNA
Univ. of California Davis, California 95616	Sean Duffey	\$50,000	08/01/84	07/31/85	Biochemical Facets of Antibiosis of Tomatoes Against Noctuid Larvae
Univ. of California Davis, California 95616	H. Kaya	\$68,000	09/15/84	09/30/86	Epizootiological Potential of the Entomogenous Nematode, <u>Neoplectana carpocapsae</u>

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: BIOLOGICAL STRESS ON PLANTS

GRANTS AWARDED FOR FISCAL YEAR 1984

ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT FROM	PERIOD TO	TITLE
Univ. of California Davis, California 95616	R. Michelmore	\$100,000	08/01/84	07/31/86	Genetics of Lettuce Downy Mildew
Univ. of California Los Angeles, Calif. 90024	Charles West	\$100,000	08/01/84	07/31/86	The Role of Transcription During Elicitation by Pectic Cell Wall Fragments
Univ. of California Riverside, California 92521	William Dawson	\$80,000	07/01/84	06/30/86	Interactions of Plant Viruses with Antiviral Chemicals
Univ. of California Riverside, California 92521	C. Lovatt	\$33,000	**09/01/82**	08/31/85	Citrus Nematode: A Critical Stress Limiting Citrus Productivity
Salk Inst. for Biological Studies P.O. Box 85800 San Diego, California 92138	C. Lamb	\$50,000	09/15/84	09/30/85	Molecular Biology of the Phytoalexin Defense Response
Yale Univ. New Haven, Connecticut 06520	Richard Harrison	\$70,000	07/15/84	07/31/86	European Corn Borer Pheromone Strains: Fate of Hybridizing Populations
Univ. of Florida Gainesville, Florida 32611	D. Boucias	\$65,000	09/01/84	08/31/86	Selection of Improved Strains of Entomopathogenic Fungi via Protoplast Fusion

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COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: BIOLOGICAL STRESS ON PLANTS

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ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT FROM	PERIOD TO	TITLE
Univ. of Florida Gainesville, Florida 32611	James Maruniak	\$90,000	07/01/84	06/30/86	Genetic Recombination in Baculo- viruses to Analyze Host Range and Virulence
Loyola Univ. of Chicago Chicago, Illinois 60153	Stephen Farrand	\$50,000	09/01/84	08/31/85	Crown Gall Control: Plasmid Engineering to Maximize Control and Minimize Failures
Univ. of Illinois Chicago, Illinois 60680	J. Lussenhop	\$46,600	07/15/84	04/30/86	Source and Dispersal of <u>Aspergillus</u> <u>flavus</u> Primary Infective Inoculum
Univ. of Notre Dame Notre Dame, Indiana 46556	Malcolm Fraser	\$70,000	07/01/84	06/30/86	Isolation of Genes of Nuclear Polyhedrosis Viruses Through Mutational Analysis
Kansas State Univ. Manhattan, Kansas 66506	Arun Chatterjee	\$80,000	08/01/84	07/31/86	Genetics and Expression of Bacterial Determinants of Soft-rot Diseases
Univ. of Kentucky Res. Fdn. Lexington, Kentucky 40506	D. Dahlman	\$65,000	09/01/84	08/31/86	Allelochemical Inhibition of Detoxification Mechanisms
Univ. of Kentucky Res. Fdn. Lexington, Kentucky 40506	Robert Shepherd	\$80,000	08/15/84	08/31/86	Defining and Mapping the Genes of Cauliflower Mosaic Virus

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: BIOLOGICAL STRESS ON PLANTS

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ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Univ. of Kentucky Res. Fdn. Lexington, Kentucky 40506	T. Pirone	\$50,000	**05/15/83 **05/31/85	Nature and Mode of Action of the Potyvirus Helper Component
Univ. of Maine Orono, Maine 04469	Stellos Tavantzis	\$50,000	07/01/84 06/30/85	Biological Control by Transmissible Hypovirulence in <u>Rhizoctonia solani</u>
USDA-ARS, Beltsville Area Beltsville, Maryland 20705	Robert Davis	\$80,000	09/15/84 09/30/86	Recombinant DNA and Gene Transfer System for <u>Spiroplasma</u>
USDA-ARS-Beltsville Area Beltsville, Maryland 20705	Jacobus Kaper	\$45,000	09/15/82** 09/30/85**	Cucumovirus Satellite-Like RNA: Structure - Biological Function
Univ. of Maryland College Park, Maryland 20742	Alan Collmer	\$100,000	07/01/84 06/30/86	Molecular Biology of the Pectate Lyase Isozymes of <u>Erwinia chrysanthemi</u>
Univ. of Massachusetts Amherst, Massachusetts 01003	Roy Van Driesche	\$57,000	07/01/84 06/30/87	Effect of Host and Parasitoid Phenology on Estimation of Natural Enemy Impacts

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COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: BIOLOGICAL STRESS ON PLANTS

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ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT FROM	PERIOD TO	TITLE
Univ. of Massachusetts Amherst, Massachusetts 01003	Ring Cardé	\$70,000	07/15/84	07/31/86	European Corn Borer Pheromone Strains: Fate of Hybridizing Populations
Univ. of Massachusetts Amherst, Massachusetts 01003	Ronald Prokopy	\$50,000	**09/01/82	**08/31/85	Host Selection Determinants in Apple Maggot and Mediterranean Fruit Flies
Michigan State Univ. East Lansing, Michigan 48824	D. T. Lampert	\$80,000	09/15/84	09/30/86	The Significance of Stress Enhanced Cell Wall Hydroxyproline Biosynthesis
Michigan State Univ. East Lansing, Michigan 48824	H. Murakishi	\$70,000	09/01/84	08/31/86	Genetic Resistance to Virus Diseases in Somatic Cells of Food Crop Species
Michigan State Univ. East Lansing, Michigan 48824	Patricia Werner	\$69,300	07/01/84	06/30/86	Plant Performance in Multi-Crop and Crop-Weed Systems: Application of the Reciprocal Yield Law
Michigan State Univ. East Lansing, Michigan 48824	Guy Bush	\$100,000	06/15/84	06/30/86	The Genetics of Host Selection in <u>Rhagoletis</u> Fruit Flies
Michigan State Univ. East Lansing, Michigan 48824	J. Miller	\$50,000	**06/01/83	**05/31/85	Quantifying Sensory Determinants Mediating Oviposition by the Onion Fly

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COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: BIOLOGICAL STRESS ON PLANTS

GRANTS AWARDED FOR FISCAL YEAR 1984

ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT FROM	PERIOD TO	TITLE
Univ. of Missouri St. Louis, Missouri 63121	R. Bolla	\$70,000	09/01/84	08/31/86	Stress Chemical Production in <u>Bursaphelenchus xylophilus</u> Caused Pinewilt
Cold Spring Harbor Laboratory P.O. Box 100 Cold Spring Harbor, New York 11724	Stephen Dellaporta	\$100,000	09/01/84	08/31/86	Genetic Consequence of Viral Stress in Maize
Boyce Thompson Inst. for Plant Res. Tower Road Ithaca, New York 14853	Patrick Hughes	\$40,000	09/01/84	08/31/85	Quantitation of Viral Pesticide Infectivity and Pathogenicity
Cornell Univ. Ithaca, New York 14853	O. Yoder	\$50,000	09/15/84	09/30/85	Structural and Functional Analysis of a Plasmid from <u>Cochliobolus</u>
Cornell Univ. Ithaca, New York 14853	A. Shelton	\$92,000	07/15/84	07/31/86	Forecasting the Area-Wide Occurrence and Risk of Infestation of a Dispersing Insect Pest
Cornell Univ. Ithaca, New York 14853	Hans VanEtten	\$80,000	07/01/84	06/30/86	The Importance of Phytoalexin Tolerance for Pathogenicity

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: BIOLOGICAL STRESS ON PLANTS

GRANTS AWARDED FOR FISCAL YEAR 1984

ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Cornell Univ. Ithaca, New York 14853	Ward Tingey	\$90,000**	**09/15/82 **09/30/86	Plant Glandular Trichomes: A Mechanism for Combatting Insect Stress
North Carolina State Univ. Raleigh, North Carolina 27650	Fred Gould	\$90,000	07/15/84 07/31/87	Assessing the Utility of Natural Feeding Deterrents in Alleviating Crop Stress
North Carolina State Univ. Raleigh, North Carolina 27650	H. Shew	\$70,000	07/01/84 06/30/86	Effects of Water Stress on Expression of Host Resistance to a <u>Phytophthora</u> sp.
North Carolina State Univ. Raleigh, North Carolina 27650	Margaret Daub	\$70,000	07/15/84 07/31/86	Resistance of Fungi to the Photosensitizing Toxin, Cercosporin
Ohio State Univ. Res. Fdn. Columbus, Ohio 43212	Lowell Nault	\$50,000	06/15/84 06/30/85	Evolution of Leafhoppers and Stunting Pathogens with Maize and Its Ancestors
Ohio State Univ. Res. Fdn. Columbus, Ohio 43212	R. Riedel	\$70,000	09/01/84 08/31/86	Synergism Between Root Lesion Nematode Species and Verticillium Dahliae on Potato

**AMENDMENT

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: BIOLOGICAL STRESS ON PLANTS

GRANTS AWARDED FOR FISCAL YEAR 1984

ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT FROM	PERIOD TO	TITLE
Oregon State Univ. Corvallis, Oregon 97331	Dallice Mills	\$90,000	07/15/84	07/31/86	Cloning and Characterization of Virulence Genes from <u>Pseudomonas phaseolicola</u>
Oregon State Univ. Corvallis, Oregon 97331	D. Hibbs	\$80,000	09/01/84	08/31/86	Intra- and Inter-specific Inter- actions Between Red Alder and Douglas-fir
Univ. of Texas Austin, Texas 78712	Mary Rankin	\$85,000	08/01/84	07/31/86	Physiological Coordination of Fitness Characters in the Mexican Bean Beetle
Agric. Expt. Station Utah State Univ. Logan, Utah 84322	Anne Anderson	\$50,000	09/15/84	09/30/85	The Role of the Plant in Biological Control of Fungal Pathogens
Univ. of Virginia Charlottesville, Virginia 22901	James Riopel	\$27,238	08/15/84	08/31/85	Host/Parasite Interactions in Parasitic Angiosperms
Washington State Univ. Pullman, Washington 99164	John Thompson	\$80,000	06/15/84	05/31/86	Genetics and Expression of Oviposition Preference in Oligophagous and Monophagous Insects

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: BIOLOGICAL STRESS ON PLANTS

GRANTS AWARDED FOR FISCAL YEAR 1984

ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Univ. of Washington Seattle, Washington 98195	Eugene Nester	\$50,000	08/01/84 07/31/85	Organization and Regulation of <u>Vir Genes of Agrobacterium</u>
Univ. of Washington Seattle, Washington 98195	Walter Halperin	\$90,000	**09/15/82 **09/30/86	Molecular and Genetic Studies of <u>Agrobacterium tumefaciens</u> Attachment Mutants
Univ. of Wisconsin Madison, Wisconsin 53706	Susan Hirano	\$80,000	07/01/84 06/30/86	Population Dynamics of Epiphytic <u>Pseudomonas syringae</u>
Univ. of Wisconsin Madison, Wisconsin 53706	Dale Norris	\$70,000	09/15/84 09/30/86	Stress-Altered Protein Synthesis Associated with Soybean Resistance to Insects
	TOTAL	\$4,241,138		

**Amendment

Genetic Mechanisms for Crop Improvement

Grants in this area are to encourage innovative or unique genetic approaches to the development of genetically superior varieties of agricultural crops. They are directed toward obtaining novel genetic combinations or gene modifications that cannot be achieved using conventional plant breeding techniques. Research areas are: acquisitions of basic information on the plant nuclear and organellar genes; development of cellular and molecular methods for identifying plant genes or traits which are important targets for genetic manipulation; development of molecular and cellular methods for crop improvement using gene transfer or genetic engineering technology; cell and tissue culture studies designed to increase our knowledge of the basic processes involved in regenerating whole plants from single cells; development of new methods for producing, selecting, and transferring agronomically important traits; and basic genetic studies on the alteration and utilization of unadapted and wild germplasm.

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: GENETIC MECHANISMS FOR CROP IMPROVEMENT

GRANTS AWARDED FOR FISCAL YEAR 1984

ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Auburn Univ. Auburn Univ., Alabama 36849	David Bisaro	\$100,000	09/01/84 08/31/86	Construction of a Plant Vector Derived from Gemini- virus DNA
Univ. of California Berkeley, California 94720	Zinmay Sung	\$80,000	07/01/84 06/30/86	The Role of Polyamines on Auxin-Regulated Growth and Differentiation
Univ. of California Berkeley, California 94720	Robert Fischer	\$70,000	09/01/84 08/31/86	Chilling and Gene Expression in Fruit
Univ. of California Davis, California 95616	Jan Dvorak	\$65,000	09/01/84 08/31/86	Transfer of Quantitative Traits: <u>Elytrigia</u> Salt Tolerance to Wheat by Chromosome Engineering
Univ. of California Davis, California 95616	C. Kado	\$120,000	07/15/84 07/31/86	Molecular Analysis of the Virulence Region of the Agro- bacterium Plasmid pTiC58
Univ. of California-- San Diego La Jolla, California 92093	Maarten Chrispeels	\$100,000**	**09/01/82 **08/31/86	Synthesis and Localization of Lectins (Phytohemagglutinin) in the Common Bean
Univ. of California Los Angeles, California 90024	Robert Goldberg	\$180,000**	**08/01/82 **06/30/86	Regulation of Soybean Seed Protein Gene Expression

**AMENDMENT

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: GENETIC MECHANISMS FOR CROP IMPROVEMENT

GRANTS AWARDED FOR FISCAL YEAR 1984

ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT FROM	PERIOD TO	TITLE
Carnegie Institution of Washington 1530 P Street, N.W. Washington, D.C. 20005	William Thompson	\$58,000**	**09/15/82	**09/30/85	Regulation of Gene Expression by Phytochrome
Florida State Univ. Tallahassee, Florida 32306	Margaret Menzel	\$100,000	09/15/84	09/30/86	Development of a Cytogenetic Manipulation System for Cotton
Univ. of Georgia Res. Fdn. Athens, Georgia 30602	Glenn Galau	\$100,000	07/15/84	07/31/86	Genetics and Molecular Biology of Cotton Cytoplasmic Male Sterility
USDA-ARS South Atlantic Area P.O. Box 5677 Athens, Georgia 30613	Charles Stuber	\$53,000**	**09/15/83	**09/30/85	Isozyme Loci as Markers for Locating and Manipulating Quantitative Trait Loci
Univ. of Chicago Chicago, Illinois 60637	Kwen-Sheng Chiang	\$100,000	07/15/84	07/31/86	Transformation and Functional Domains of the Chloroplast Genome
USDA/Mid-West Area, NCR-ARS Peoria, Illinois 61604	J. Ohlrogge	\$70,000	09/01/84	08/31/86	Regulation of Fatty Acid Synthesis Proteins in Soybean

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COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: GENETIC MECHANISMS FOR CROP IMPROVEMENT

GRANTS AWARDED FOR FISCAL YEAR 1984

ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT FROM	PERIOD TO	TITLE
Univ. of Illinois Urbana, Illinois 61801	John Laughnan	\$70,000	08/01/84	07/31/86	Insertion of Controlling Elements into <u>cm-S</u> Fertility Restorer Genes in Maize
Indiana Univ. Fdn. Bloomington, Indiana 47401	Lloyd Ream	\$110,000	09/01/84	08/31/86	Inducible Virus Resistance Genes
Purdue Research Fdn. West Lafayette, Indiana 47907	Jeffrey Bennetzen	\$120,000	09/01/84	08/31/86	Analysis of the Molecular Genetics of a Mutator Phenomenon in Maize
Purdue Research Fdn. West Lafayette, Indiana 47907	Nicholas Carpita	\$60,000	09/15/84	09/30/86	Cell Wall Regeneration in Protoplasts
Purdue Research Fdn. West Lafayette, Indiana 47907	K. Herrmann	\$80,000	09/01/84	08/31/86	Regulatory Mechanisms in the Biosynthesis of Aromatic Compounds in Higher Plants
Purdue Research Fdn. West Lafayette, Indiana 47907	Stanton Gelvin	\$40,000**	**09/01/82	**08/31/85	Chromatin Structure and Ti Plasmid Integration

**AMENDMENT

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: GENETIC MECHANISMS FOR CROP IMPROVEMENT

GRANTS AWARDED FOR FISCAL YEAR 1984

ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT FROM	PERIOD TO	TITLE
USDA-ARS-Central Plains Area P.O. Box 70 Ames, Iowa 50010	J. Gustafson	\$60,000	09/01/84	08/31/86	Analysis of the Effect of Hetero- chromatin Sequence Deficient Rye Chromosomes on Triticale
Iowa State Univ. of Science & Technology Ames, Iowa 50011	D. Morris	\$80,000	08/01/84	07/31/86	The Role of Transposable Elements in Mutator Activity in Maize
Univ. of Iowa Iowa City, Iowa 52242	W. Carlson	\$60,000**	**09/15/82	**09/30/86	A New Approach to Producing Segmental Aneuploidy in Maize
Kansas State Univ. Manhattan, Kansas 66506	Rollin Sears	\$22,000	07/15/84	07/31/85	Chromosomal Mapping of Genes Controlling Tissue Culture Response in Wheat
Kansas State Univ. Manhattan, Kansas 66506	Charlie Hedgcoth	\$80,000	09/15/84	09/30/86	Gliadin Genes of Common Wheat and Its Ancestors
Univ. of Kentucky Res. Fdn. Lexington, Kentucky 40506	N. Taylor	\$53,000**	**09/01/83	**08/31/85	Genetics and Breeding of Somaclonal Variation in Red Clover
Michigan State Univ. East Lansing, Michigan 48824	Harry Murakishi	\$5,000**	**08/31/79	**08/30/84	Genetic Resistance to Virus Diseases in Somatic Cells of Crop Plant Species

**AMENDMENT

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: GENETIC MECHANISMS FOR CROP IMPROVEMENT

GRANTS AWARDED FOR FISCAL YEAR 1984

ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT FROM	PERIOD TO	TITLE
USDA-ARS-Northern States Area 15 South Fifth Street Minneapolis, Minnesota 54402	D. Peterson	\$90,000	09/01/84	08/31/87	Mechanisms of Genetic Regulation of Shrunken Endosperm Mutants in Barley
USDA/ARS, Northern States Area 15 South Fifth Street Minneapolis, Minnesota 54402	John Helgeson	\$50,000	09/15/84	09/30/86	Somatic Fusion and Somatic Variation in <u>Solanum</u>
USDA/ARS-Northern States Area Univ. of Minnesota 266 North Hall St. Paul, Minnesota 55108	Richard Smith	\$55,000	09/01/84	08/31/86	Intra- and Interspecific Germplasm Transfer in <u>Trifolium</u> spp. Using 2n Gametes
Univ. of Minnesota St. Paul, Minnesota 55108	Thomas Guilfoyle	\$100,000**	**09/01/82	**08/31/86	Reverse Transcriptase and Replication of Cauliflower Mosaic Virus
Univ. of Missouri Columbia, Missouri 65211	Donald Miles	\$100,000	09/15/84	09/30/86	Nuclear Genes in Corn Which Regulate Proteins for Chloroplast Membranes
Univ. of Missouri Columbia, Missouri 65211	M. Neuffer	\$60,000	09/01/84	08/31/87	Selection, Characterization and Preservation of Mutants in Corn

**AMENDMENT

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: GENETIC MECHANISMS FOR CROP IMPROVEMENT

GRANTS AWARDED FOR FISCAL YEAR 1984

ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT FROM	PERIOD TO	TITLE
Univ. of Missouri Columbia, Missouri 65211	Joseph Polacco	\$80,000	09/01/84	08/31/86	Genetic Regulation of a Seed-Specific Protein in Soybean
Montana State Univ. Bozeman, Montana 59717	Thomas Blake	\$80,000	09/15/84	09/31/86	Use of Single Copy Cloned DNA Sequences as a Basis for Gene Mapping in Barley
Univ. of Nebraska Lincoln, Nebraska 68588	John Osterman	\$80,000	09/01/84	08/31/86	Transposition of Maize Controlling Elements
Cornell Univ. Ithaca, New York 14853	M. Mutschler	\$40,000**	**09/01/82	**08/31/85	Genetic Modification of Cytoplasmic Traits in <u>Brassica</u> Species
Rensselaer Polytechnic Institute Troy, New York 12181	Carl McDaniel	\$55,000	09/15/84	09/30/86	Genetic Control of Floral Development
North Carolina State Univ. Raleigh, North Carolina 27650	Harold Stalker	\$30,000**	**09/01/83	**08/31/85	Biosystematics and Utilization of <u>Arachis</u> Species to Improve Cultivated Peanuts

**AMENDMENT

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: GENETIC MECHANISMS FOR CROP IMPROVEMENT

GRANTS AWARDED FOR FISCAL YEAR 1984

ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
North Dakota State Univ. Fargo, North Dakota 58105	Shivcharan Maan	\$75,000	07/01/84 06/30/87	Development of A- and B- Lines and Use of R-Lines with <u>Rf</u> Genes in Hybrid Wheat
Agric. Expt. Station North Dakota State Univ. Fargo, North Dakota 58105	Norman Williams	\$57,000	08/15/84 08/31/86	Induced Mutations of Sporophytic and Nucleo-Cytoplasmic Sterility Mechanisms in Common Wheat
Oregon State Univ. Corvallis, Oregon 97331	D. Mok	\$80,000	09/15/84 09/30/86	Genetic Regulation of Cytokinin Metabolism in Food Legumes
Oregon State Univ. Corvallis, Oregon 97331	Ralph Quatrano	\$150,000	09/01/84 08/31/86	Control of Gene Expression During Maturation of the Wheat Grain
Oregon State Univ. Corvallis, Oregon 97331	Donald Armstrong	\$70,000**	**09/15/82 **09/30/86	Genetic Regulation of Hormonal Metabolism in Food Legumes
Univ. of Tennessee Knoxville, Tennessee 37996	Bob Conger	\$80,000**	**09/01/82 **08/31/86	Development of <u>in vitro</u> Culture Systems for Cool Season Forage Grasses

**AMENDMENT

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: GENETIC MECHANISMS FOR CROP IMPROVEMENT

GRANTS AWARDED FOR FISCAL YEAR 1984

ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Univ. of Tennessee Knoxville Tennessee 37996	Karen Hughes	\$70,000	09/15/84 09/30/86	Genetic Characterization of Paraquat Resistance and Embryo Lethality in Tobacco
Texas A&M Res. Fdn. College Station, Texas 77843	Terry Thomas	\$80,000	07/01/84 06/30/86	Isolation of Hormone Regulated Genes Expressed During Carrot Somatic Embryogenesis
Texas A&M Res. Fdn. College Station, Texas 77843	David Stelly	\$47,620	09/15/84 09/30/86	Genetic Control of Semigamy and Derivation of Nullisomic Cotton
Texas A&M Res. Fdn. College Station, Texas 77843	Roberta Smith	\$50,000	09/15/84 09/30/86	Cellular Selection of Genetic Variants in Sorghum for Breeding Improvement
Texas A&M Res. Fdn. College Station, Texas 77843	Hugh Wilson	\$53,000**	**09/15/83 **09/30/85	Genetic Structure of Weed-Crop Population Systems (<u>Cucurbita</u> and <u>Chenopodium</u>)
Texas A&M Res. Fdn. College Station, Texas 77843	William Park	\$73,000**	**09/15/83 **09/30/85	Regulation of Tuber Protein Synthesis in Potato

**AMENDMENT

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: GENETIC MECHANISMS FOR CROP IMPROVEMENT

GRANTS AWARDED FOR FISCAL YEAR 1984

ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Washington State Univ. Pullman, Washington 99164	M. Thomashow	\$44,100**	**08/01/83 **07/31/85	Characterization of <u>Nicotiana</u> - pTiAg63 Related DNA Sequences
Washington State Univ. Pullman, Washington 99164	Clarence Ryan	\$20,000	08/15/84 08/31/85	Differential Expression of Proteinase Inhibitor Genes in Plant Tissues
Washington State Univ. Pullman, Washington 99164	Andris Kleinhofs	\$80,000**	**09/01/82 **08/31/86	Genetics of Nitrate Reduction
Univ. of Wisconsin Madison, Wisconsin 53706	E. T. Bingham	\$50,000	09/15/84 09/30/86	Alfalfa Variants Regenerated from Cell Cultures: Genetic Analysis and Transfer to Breeding Lines
Univ. of Wisconsin Madison, Wisconsin 53706	S. Peloquin	\$119,000	09/15/84 09/30/87	The Use of Meiotic Mutants for the Exploitation of <u>Solanum</u> Germplasm

TOTAL \$4,054,720

**AMENDMENT

Photosynthesis

Grants in this area focus on a better understanding of photosynthesis and associated carbon metabolism. Photosynthesis is the process that crop plants use to convert solar energy into food products that plants and animals use for growth and development.

The program's aim is to cover such areas as the mechanisms of energy capture and conversion, structure, synthesis, and turnover of the photosynthetic apparatus, CO₂ fixation, photorespiration, and dark respiration. Other areas included in this program are projects on the relation of plant development to photosynthesis, including development of photosynthetic competence, translocation and partitioning of photosynthetic products; and design of whole leaf and whole plant structures best suited for photosynthetic productivity. Another area set forth for proposals is the design of new methods of genetic and cellular manipulation to improve photosynthetic efficiency in plants--including studies of the chloroplast genome, of nuclear genes regulating photosynthesis, and analysis of regulatory steps controlling both nuclear and cytoplasmic genome expression and their interactions.

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: PHOTOSYNTHESIS

GRANTS AWARDED FOR FISCAL YEAR 1984

ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT FROM	PERIOD TO	TITLE
Univ. of Arizona Tucson, Arizona 85721	Richard Jensen	\$93,000**	**07/15/82	**07/31/86	Regulation of Photosynthetic CO ₂ Assimilation in Wheat and Other Plants
Univ. of California Berkeley, California 94720	John Hearst	\$75,000	08/15/84	08/31/86	Suicide Quinones for Photosynthesis
Univ. of California Berkeley, California 94720	William Taylor	\$100,000	08/01/84	07/31/86	Assembly of the C4 Pathway During Leaf Development
Univ. of California-- San Diego La Jolla, California 92093	Melvin Okamura	\$85,000**	**08/01/82	**07/31/86	Quinone and Herbicide Binding Sites on Bacteria Reaction Centers
Univ. of California Santa Barbara, Calif. 93106	Bruce Mahall	\$85,000	07/01/84	06/30/86	Photoinhibition, Photorespiration and Drought Recovery in Chaparral Shrubs
Mountain States Area USDA-ARS Ft. Collins, Colorado 80522	R. Wyse	\$45,926	09/01/84	08/31/85	Control Mechanisms for Photosynthate Partitioning in Sugarbeet

**AMENDMENT

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: PHOTOSYNTHESIS

GRANTS AWARDED FOR FISCAL YEAR 1984

ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT FROM	PERIOD TO	TITLE
Univ. of Florida Gainesville, Florida 32611	Charles Johnson	\$80,000	09/15/84	09/30/86	Photosynthate Partitioning in a Mycorrhizal Symbiosis
Univ. of Florida Gainesville, Florida 32611	Karen Koch	\$85,000	09/01/84	08/31/86	Phloem Unloading and Photo- synthate Transfer in Citrus Fruit
Univ. of Florida Gainesville, Florida 32611	G. Bowes	\$90,000**	**09/01/82	**08/31/86	Photosynthesis and Photo- respiration in Algae and Higher Aquatic Plants
Univ. of Illinois Urbana, Illinois 61801	Colin Wraight	\$100,000	09/15/84	09/30/86	Herbicide Action and Selectivity in Photosynthetic Electron Transport
Univ. of Illinois Urbana, Illinois 61801	Antony Crofts	\$75,000	09/01/84	08/31/86	The Mechanism of Reduction of Plastoquinone by Photosystem II in Chloroplasts
Univ. of Illinois Urbana, Illinois 61801	D. Ort	\$100,000**	**09/01/82	**08/31/86	The Physiological and Biochemical Basis for Chilling Impairment of Photosynthesis

**AMENDMENT

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: PHOTOSYNTHESIS

GRANTS AWARDED FOR FISCAL YEAR 1984

ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT FROM	PERIOD TO	TITLE
Univ. of Illinois Urbana, Illinois 61801	C. Whitmarsh	\$70,000**	**08/15/82	**08/31/86	Electron and Proton Transfer in Photosynthesis
Purdue Research Fdn. West Lafayette, Indiana 47907	Richard Dilley	\$75,000	08/15/84	08/31/86	Chloroplast Membrane-Proton Interactions Related to Photophosphorylations
Purdue Research Fdn. West Lafayette, Indiana 47907	John Markley	\$50,000**	**08/15/82	**08/31/85	Mechanisms of Electron Transport in Photosynthesis
Univ. of Maryland College Park, Maryland 20742	Irwin Forseth	\$74,958	09/01/84	08/31/86	Integration of Leaf Orientation and Photosynthesis in Response to Environmental Drought
Amherst College Amherst, Massachusetts 01002	R. Blankenship	\$100,000	08/01/84	07/31/86	Mechanism of Primary and Secondary Reactions in Photosynthetic Bacteria
Harvard College Cambridge, Massachusetts 02138	Lawrence Bogorad	\$50,000**	**08/15/82	**08/31/85	Genes for Photosynthesis in Corn
Massachusetts Inst. of Technology Cambridge, Massachusetts 02139	Lisa Steiner	\$75,000	09/01/84	08/31/86	Reaction Center Protein in Primary Process of Photosynthesis

**AMENDMENT

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: PHOTOSYNTHESIS

GRANTS AWARDED FOR FISCAL YEAR 1984

ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT FROM	PERIOD TO	TITLE
Univ. of Michigan Ann Arbor, Michigan 48109	Charles Yocum	\$90,000**	**09/15/82	**09/30/86	Biochemistry of Photosynthetic Oxygen Evolution
Michigan State Univ. East Lansing, Michigan 48824	Gerald Babcock	\$130,000	08/01/84	07/31/86	Charge Separation and Stabiliza- tion in Chloroplast Photosystem II
Michigan State Univ. East Lansing, Michigan 48824	C. Somerville	\$59,500**	**07/15/83	**07/31/85	Directed Genetic Modification of RuBP Carboxylase/Oxygenase
Univ. of Minnesota St. Paul, Minnesota 55108	W. Brun	\$75,000	09/15/84	09/30/86	Effect of Absciscic Acid on Assimilate Transfer from Maternal to Embryonic Soybean Tissues
Univ. of Missouri Columbia, Missouri 65211	Louis Sherman	\$90,000	09/01/84	08/31/86	Gene Organization and Cloning of Photosynthesis Genes in <u>Anacystis nidulans</u> R2
Univ. of Nevada System Reno, Nevada 89506	Charles Osmond	\$100,000	09/01/84	08/31/86	Nitrogen Use Efficiency in Photosynthesis: Responses to Irradiance and Water Stress
Cornell Univ. Ithaca, New York 14853	R. Spanswick	\$85,000	09/01/84	08/31/86	The Role of Membrane Transport System in the Partitioning of Photosynthate

**AMENDMENT

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: PHOTOSYNTHESIS

GRANTS AWARDED FOR FISCAL YEAR 1984

ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT FROM	PERIOD TO	TITLE
Univ. of Rochester Rochester, New York 14627	Robert Knox	\$100,000**	**09/01/82	**08/31/86	Ultrafast Electronic Processes in Chlorophyll-Proteins
U.S. Dept. of Energy Brookhaven Nat. Lab. Upton, New York 11973	Harold Siegelman	\$70,000	09/15/84	09/30/86	Photoregulation of Phycoerythrin Synthesis and Phycobilisome Structure
U.S. Dept. of Energy Brookhaven Nat. Lab. Upton, New York 11973	John Bennett	\$50,000	09/01/84	08/31/85	Chloroplast Protein Kinases and the Regulation of Photosynthesis
Oklahoma State Univ. Stillwater, Oklahoma 74078	R. Johnson	\$70,000	08/01/84	07/31/86	Stomatal Behavior and Photosyn- thesis in Wheat Under Drought and at Elevated CO ₂
Oklahoma State Univ. Stillwater, Oklahoma 74078	Chang-An Yu	\$85,000**	**08/01/82	**07/31/86	Electron Transfer in Photysynthetic Apparatus
Oregon State Univ. Corvallis, Oregon 97331	Norman Bishop	\$85,000**	**08/15/82	**08/31/86	Biochemical and Developmental Studies of Proteins Associated with Oxygen Evolution

**AMENDMENT

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: PHOTOSYNTHESIS

GRANTS AWARDED FOR FISCAL YEAR 1984

ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Pennsylvania State Univ. Univ. Park, Pennsylvania 16802	S. Stevens	\$80,000**	**08/15/82 **11/30/85	The Phycocyanin Genes of <u>Agmenellum quadruplicatum</u>
South Dakota State Univ. Brookings, South Dakota 57007	Christian Paech	\$92,000**	**08/15/82 **09/30/86	Kinetics and <u>in vivo</u> Operation of <u>Ribulose Biphosphate Carboxylase/</u> Oxygenase
U.S. Dept. of Energy Oak Ridge Operations P.O. Box E Oak Ridge, Tennessee 37831	Fred Hartman	\$105,000	09/15/84 09/30/86	Characterization of Phospho-ribulokinase, a Regulatory Enzyme in Photosynthesis
Virginia Polytechnic Inst. & State Univ. Blacksburg, Virginia 24061	Jerome Servaites	\$55,000	09/01/84 08/31/86	Factors Controlling <u>in vivo</u> Regulation of RuBP Carboxylase Activity
Univ. of Washington Seattle, Washington 98195	William Parson	\$29,500	08/01/84 07/31/85	Photodichroism in Triplet States of Bacterial Reaction Centers
Medical College of Wisconsin, Inc. Milwaukee, Wisconsin 53226	Henry Miziorko	\$120,000	09/01/84 08/31/86	Regulated Enzymes in CO ₂ Fixation: Mechanisms of Activation and Catalysis

TOTAL \$3,079,884

Human Requirements for Nutrients

The emphasis in this program area is on determining human requirements for nutrients. Support is not provided for clinical research or for demonstration or action projects.

Research in human nutrition contributes to improving human nutritional status by increasing our understanding of requirements for nutrients in relation to different patterns of food intake. Findings help fill the gaps of our knowledge related to nutrient requirements, bioavailability, the inter-relationships of nutrients, and the nutritional value of foods consumed in the United States as they relate to these requirements. Special attention in this program area is given to the study of trace constituents of foods and their effect on human health.

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: HUMAN REQUIREMENTS FOR NUTRIENTS

GRANTS AWARDED FOR FISCAL YEAR 1984

ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Univ. of Arizona Tucson, Arizona 85721	K. Lei	\$60,000	07/01/84 06/30/86	Dietary Copper and Lipoprotein Metabolism
USDA-ARS-Pacific Basin Area 800 Buchanan Street Albany, California 94710	Judith Turnlund	\$70,000**	**09/15/82 **09/30/85	Use of Stable Isotopes to Determine Dietary Requirements of Zn, Cu, Fe, Ca, and Mg
Univ. of California Davis, California 95616	Barbara Schneeman	\$35,000	06/15/84 06/30/85	Importance of Endogenous Zinc in Bioavailability
Univ. of California Los Angeles, Calif. 90024	Isabelle Hunt	\$75,000**	**09/01/83 **06/30/85	Diet and Bone Mineral Density in Women Aged 50-79 Years
George Washington Univ. Washington, D.C. 20052	Marie Cassidy	\$70,000**	**08/01/82 **07/31/85	Dietary Fibers and Structural/ Functional Correlations of Development in the Neonate Intestine
George Washington Univ. Washington, D.C. 20052	George Vahouny	\$100,000**	**08/01/82 **07/31/85	Dietary Fibers and Nutrient Absorption: Structure-Function Correlations
Univ. of Illinois Urbana, Illinois 61801	Adria Sherman	\$85,000	09/01/84 08/31/87	Effects of Iron Nutriture on Folate Metabolism in the Neonate

**AMENDMENT

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: HUMAN REQUIREMENTS FOR NUTRIENTS

GRANTS AWARDED FOR FISCAL YEAR 1984

ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Purdue Research Fdn. West Lafayette, Indiana 47907	Jon Story	\$70,000**	**09/01/83 **08/31/85	Mechanisms of Alteration of Bile Acid Excretion by Dietary Fiber
Iowa State Univ. Ames, Iowa 50011	James Olson	\$150,000	09/15/84 09/30/87	Evaluation of the Status and Requirements of Humans for Vitamin A
Johns Hopkins Univ. Charles & 34th Streets Baltimore, Maryland 21218	Tomas Guilarte	\$75,000**	**07/01/81 **06/30/85	Radiometric-Microbiological Assay of B-Vitamins in Human Blood and Food
Massachusetts Inst. of Technology Cambridge, Massachusetts 02139	Vernon Young	\$100,000	09/15/84 09/30/85	A Novel Approach for Study of Human Amino Acid Metabolism and Dietary Requirements
Massachusetts Inst. of Technology Cambridge, Massachusetts 02139	George Wolf	\$80,000**	**09/01/81 **08/31/85	Biochemical Reasons for the Requirement of Vitamin A in the Mammalian Organism

**AMENDMENT

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: HUMAN REQUIREMENTS FOR NUTRIENTS

GRANTS AWARDED FOR FISCAL YEAR 1984

ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Michigan State Univ. East Lansing, Michigan 48824	Maija Zile	\$85,000	07/01/84 06/30/86	Metabolism and Function of Retinoic Acid in the Small Intestine
Univ. of Missouri Columbia, Missouri 65211	Calvin Woodruff	\$74,360	08/15/84 08/31/85	Vitamin A Requirements of Preterm Infants
Univ. of Missouri Columbia, Missouri 65211	Edward Pickett	\$50,000**	**09/01/83 **08/31/85	Nutritional Essentiality of Lithium
St. Louis Univ. St. Louis, Missouri 63103	Coy Fitch	\$60,000**	**09/15/82 **09/30/85	Interrelationship of Iron and Vitamin E
Cornell Univ. Ithaca, New York 14853	John Kinsella	\$75,000**	**07/15/82 **09/30/85	Antithrombotic Action of n3 Polyunsaturated Acids: Optimum Intake and Effects on Prostaglandins
Oregon State Univ. Corvallis, Oregon 97331	James Leklem	\$80,000	09/15/84 09/30/86	<u>In vitro</u> Method to Assess Vitamin B6 Bioavailability in Humans

**AMENDMENT

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: HUMAN REQUIREMENTS FOR NUTRIENTS

GRANTS AWARDED FOR FISCAL YEAR 1984

ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT FROM	PERIOD TO	TITLE
Univ. of Pennsylvania Philadelphia, Penn. 19104	Susan Donoghue	\$100,000	09/01/84	08/31/86	Vitamin A Deficiency in Pregnancy and Fetal Life
Univ. of Texas Austin, Texas 78712	J. Freeland-Graves	\$65,000	07/15/84	07/31/85	Manganese: Assessment of Requirements and Functions
Texas A&M Res. Fdn. College Station, Texas 77843	Randall Wood	\$100,000	09/01/84	08/31/86	Metabolism of Dietary <u>cis</u> and <u>trans</u> Isomeric Fatty Acids
Univ. of Vermont & State Agric. College Burlington, Vermont 05405	Elliot Danforth	\$80,000**	**08/01/83	**07/31/85	Diet-Induced Alterations in Thyroid Hormone Metabolism and Nutritional Requirements
Univ. of Wisconsin Madison, Wisconsin 53706	Janet Greger	\$45,000	07/15/84	07/31/85	Effects of Tea and Coffee on Mineral Metabolism
Univ. of Wisconsin Madison, Wisconsin 53706	John Suttie	\$140,000	09/15/84	09/30/86	Phylloquinone Metabolism in Man and Animals

TOTAL \$1,924,360

**AMENDMENT

SPECIAL RESEARCH GRANTS PROGRAM

The objective of this grant program is to carry out research to facilitate or expand promising breakthroughs in areas of food and agricultural sciences of importance to the Nation. Three major areas of research were funded under this program during Fiscal year 1984:

Animal health research	\$6,899,672
Aquaculture research	499,445
Soybean research	499,445
TOTAL	<u>\$7,898,562</u>

This program is administered under the authority of Section 2(c)(1) of P.L. 89-106, as amended. Eligible institutions include land-grant colleges and universities, research foundations established by land-grant colleges and universities, State agricultural experiment stations, and all colleges and universities having a demonstrable capacity in food and agricultural research.

A brief description of each of the three areas of research in the Special Research Grants Program follows with a listing of research grants awarded in each for FY 1984.

Animal Health

Overall, this research is to develop and/or refine abiotic and biotic methods to suppress animal losses from infectious and noninfectious diseases and internal and external parasites. The research is directed toward clarifying infectious and noninfectious diseases and parasites and their interactive effects on animal health; and to develop practical and implementable management systems for the producer to prevent or alleviate these causes of animal losses.

Research includes clarification of complex or unknown etiologies, development or improvement of diagnostic methodologies, clarification of disease pathogenesis and methods of transmission, studies of resistance mechanisms and resistance-enhancing factors and development of disease prevention, control or eradication technologies.

Research is centered on highest priority animal health problems of beef and dairy cattle, swine, poultry, sheep, horses and aquaculture species as identified by the Animal Health Science Research Advisory Board. This includes studies on major causes of disease losses in beef and dairy cattle production such as the respiratory disease complex, reproductive diseases including brucellosis and anestrus, enteric and digestive diseases, mastitis, bluetongue, parasites and metabolic diseases. Research on swine centers on health hazards such as enteric, reproductive and respiratory diseases, and other major problems such as pseudorabies and trichinosis. Poultry disease studies include respiratory diseases, skeletal problems, enteric, neoplastic and immunologic disorders. Sheep research includes diseases such as foot rot, respiratory diseases, parasites and bluetongue. Equine health research centers on respiratory, enteric and reproductive diseases and musculo-skeletal disorders. Research on diseases in aquaculture species also is included.

SPECIAL RESEARCH GRANTS PROGRAM
PROGRAM AREA: ANIMAL HEALTH RESEARCH

GRANTS AWARDED FOR FISCAL YEAR 1984

ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT FROM	PERIOD TO	TITLE
Auburn Univ. Auburn Univ., Alabama 36849	Victor Panangala	\$89,256	08/01/84	07/31/87	Test for Detection of <u>Mycoplasma gallisepticum</u> and <u>M. synoviae</u> Infection in Chickens
Auburn Univ. Auburn Univ., Alabama 36849	Kenneth Nusbaum	\$58,099	09/15/84	09/30/86	Latency and Diagnosis of Channel Catfish Virus in Channel Catfish
Auburn Univ. Auburn Univ., Alabama 36849	John Weete	\$74,423	08/01/84	07/31/87	Chemical Basis for Virulence Among <u>Fusobacterium necrophorum</u> Biotypes A, AB, and B
Univ. of Alabama Birmingham, Alabama 35294	Polly Roy	\$122,000	09/15/84	09/30/86	Diagnosis of Bluetongue Disease in Sheep and Characterization of Viral Antigenic Site
Univ. of Arizona Tucson, Arizona 85721	Lynn Joens	\$139,728	08/01/84	07/31/87	Development of Immunity to Swine Dysentery in Pigs
Univ. of California Davis, California 95616	Laurel Gershwin	\$102,449	07/01/84	06/30/86	The Role of Immunoglobulin E in Bovine Respiratory Disease

SPECIAL RESEARCH GRANTS PROGRAM
PROGRAM AREA: ANIMAL HEALTH RESEARCH

GRANTS AWARDED FOR FISCAL YEAR 1984

ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT FROM	PERIOD TO	TITLE
Univ. of California Davis, California 95616	Dwight Hirsh	\$132,820	07/01/84	06/30/86	Virulence Determinants in <u>Pasteurella multocida</u> in Avian Origin
Univ. of California Davis, California 95616	Michael Bruss	\$50,444	09/01/84	08/31/85	Immunologic and Toxic Properties of <u>Pasteurella</u> <u>haemolytica</u> Endotoxin in Bovine Pneumonia
Colorado State Univ. Ft. Collins, Colorado 80523	Terry Nett	\$117,132	09/15/84	09/30/87	Factors Regulating LH Synthesis in the Postpartum Beef Cow
Colorado State Univ. Ft. Collins, Colorado 80523	P. Brennan	\$126,057	09/01/84	08/31/86	Serodiagnosis of Paratubercu- losis Based on Specific Glycolipid Antigens
Colorado State Univ. Ft. Collins, Colorado 80523	C. Blair	\$101,103	08/01/84	07/31/86	Pox Virus as a Cloning Vector for Immunization Against Bovine Herpes Virus I
Colorado State Univ. Ft. Collins, Colorado 80523	Richard Bowen	\$74,852	08/01/84	07/31/86	Interferon Production and Response in Preimplantation Bovine Embryos

SPECIAL RESEARCH GRANTS PROGRAM
PROGRAM AREA: ANIMAL HEALTH RESEARCH

GRANTS AWARDED FOR FISCAL YEAR 1984

ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT FROM	PERIOD TO	TITLE
Univ. of Connecticut Storrs, Connecticut 06268	Tsu-Ju Yang	\$117,186	07/01/84	06/30/86	Immunoregulatory Role of Lymphocyte Subsets in Resistance to Bovine Mastitis
Univ. of Delaware Newark, Delaware 19711	Jack Gelb	\$59,412	07/15/84	07/31/87	Development of Avian Infectious Bronchitis Virus Temperature- Sensitive Mutants
Univ. of Florida Gainesville, Florida 32611	M. Drost	\$123,784	09/15/84	03/31/88	Reducing Embryonic Mortality Associated with Heat Stress and Repeat Breeding
Univ. of Florida Gainesville, Florida 32611	M.J. Lawman	\$149,337	07/01/84	06/30/87	Recombinant Interferons and Macrophage-mediated Defense of the Bovine Lung
Univ. of Georgia Res. Fdn. Athens, Georgia 30602	S. Kadis	\$94,911	07/15/84	07/31/87	Pathogenesis of Porcine <u>Hemophilus</u> Pleuropneumonia
Univ. of Idaho Moscow, Idaho 83843	Wayne Magee	\$121,000	07/01/84	06/30/87	Diagnosis of Chlamydial Infections in Sheep with Monoclonal Antibodies

SPECIAL RESEARCH GRANTS PROGRAM
PROGRAM AREA: ANIMAL HEALTH RESEARCH

GRANTS AWARDED FOR FISCAL YEAR 1984

ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT FROM	PERIOD TO	TITLE
Purdue Res. Fdn. West Lafayette, Indiana 47907	Rodney Allrich	\$104,039	09/15/84	09/30/87	Endocrine Mechanisms Contributing to Non-detected Estrus in Postpartum Dairy Cows
Purdue Research Fdn. West Lafayette, Indiana 47907	Charles Chrisman	\$53,000	09/15/84	09/30/86	Cytogenetic Consequences of Heat Stress in Male Swine
Iowa State Univ. of Science & Technology Ames, Iowa 50011	Gary Osweiler	\$43,615	07/15/84	07/31/86	Relationship of Mycotoxins to Swine Reproductive Failure
Iowa State Univ. of Science & Technology Ames, Iowa 50011	Gerald Woode	\$100,000	09/01/84	08/31/86	Virus and Cryptosporidium as Causes of Diarrhea in Newborn Calves
Iowa State Univ. of Science & Technology Ames, Iowa 50011	L. Arp	\$70,870	09/15/84	09/30/87	Role of Serum Complement in Pathogenesis of <u>E. coli</u> Infection of Turkeys
Iowa State Univ. of Science & Technology Ames, Iowa 50011	Henry Stahr	\$47,869	08/01/84	07/31/85	Detoxification of Trichothecene Mycotoxins for Swine

SPECIAL RESEARCH GRANTS PROGRAM
PROGRAM AREA: ANIMAL HEALTH RESEARCH

GRANTS AWARDED FOR FISCAL YEAR 1984

ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT FROM	PERIOD TO	TITLE
Univ. of Iowa Iowa City, Iowa 52242	John Butler	\$128,419	09/01/84	08/31/87	Studies on Selected Swine Immunoglobulin Isotypes, Subisotypes, and Idiotypes
Kansas State Univ. Manhattan, Kansas 66506	Frank Blecha	\$150,000	07/01/84	06/30/87	Interleukin Regulation in Stressed Feeder Calves
Kansas State Univ. Manhattan, Kansas 66506	A. Broce	\$51,634	08/01/84	07/31/86	Role and Identification of Ovipositional Attractants for the Stable Fly in Aged Manure
Agric. Expt. Station Univ. of Kentucky Lexington, Kentucky 40546	Bruce Langlois	\$85,014	08/01/84	07/31/88	Importance and Prevalence of Non- <u>Staphylococcus</u> <u>aureus</u> Species Associated with Mastitis
Louisiana State Univ. and A&M College Baton Rouge, Louisiana 70803	J. Malone	\$70,548	09/15/84	09/30/86	Cattle Liver Flukes: Effect of Climate on Disease Risk and Control
Louisiana State Univ. and A&M College Baton Rouge, Louisiana 70803	Johannes Storz	\$133,666	08/01/84	07/31/87	New Methods for Detecting Bovine Chlamydial Infections

SPECIAL RESEARCH GRANTS PROGRAM
PROGRAM AREA: ANIMAL HEALTH RESEARCH

GRANTS AWARDED FOR FISCAL YEAR 1984

ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT FROM	PERIOD TO	TITLE
Louisiana State Univ. and A&M College Baton Rouge, Louisiana 70803	J. Williams	\$104,881	07/01/84	06/30/87	Control of Gastrointestinal Nematodes of Cattle by Management Practices
Univ. of Massachusetts Amherst, Massachusetts 01003	Martin Sevoian	\$100,000	09/01/84	08/31/86	Reagent/Methods/Characterization of Immune Response to Bovine Mastitis
Michigan State Univ. East Lansing, Michigan 48224	Leland Velicer	\$144,666**	**08/15/82	**08/31/86	Biotechnology and Proteins in Marek's Disease, Immuno- suppression and Protection
Univ. of Minnesota St. Paul, Minnesota 55104	Allen Leman	\$145,077	09/15/84	09/30/87	Disease and Management Factors Associated with Litter Size and Sow Culling
Univ. of Minnesota St. Paul, Minnesota 55104	C. Pijoan	\$120,000	07/01/84	06/30/87	<u>Pasteurella multocida</u> Exotoxin: Characterization and Role in Swine Pneumonia
Univ. of Mississippi Medical Center Jackson, Mississippi 39216-4505	Lester Clem	\$48,846*	09/15/84	09/30/86	Immunodiagnostic and Preventive Procedures with Channel Catfish

*\$31,154 also provided under Aquaculture Research program area.
This grant was awarded in the amount of \$80,000.

**AMENDMENT

SPECIAL RESEARCH GRANTS PROGRAM
PROGRAM AREA: ANIMAL HEALTH RESEARCH

GRANTS AWARDED FOR FISCAL YEAR 1984

ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT FROM	PERIOD TO	TITLE
Agric./For. Expt. Stn. Mississippi State Univ. Ms. State, Mississippi 39762	Bruce Glick	\$148,516	09/01/84	08/31/87	The Secretary Cell in the Genesis of the Immune Response
Univ. of Missouri Columbia, Missouri 65211	H. Garverick	\$119,982	09/15/84	09/30/86	Relationship of Anestrus to Subnormal Luteal Function in Cattle
Agric. Expt. Station Univ. of Nebraska Lincoln, Nebraska 68583	Gary Anderson	\$103,000	09/01/84	08/31/86	Immunoperoxidase and Monoclonal Antibodies: Diagnosis of Bluetongue Virus-induced Fetal Disease
Cornell Univ. Ithaca, New York 14853	A. Torres-Medina	\$148,087	07/15/84	07/31/87	Bovine Intestinal Immunity: Antigen Uptake by Epithelium of Peyer's Patches
Cornell Univ. Ithaca, New York 14853	Neil Norcross	\$79,000	07/15/84	07/31/87	Evaluation of a <u>Staphylococcus aureus</u> Vaccine for Bovine Mastitis
Cornell Univ. Ithaca, New York 14853	John Timoney	\$48,203	09/01/84	08/31/85	Cloning the Gene for the Toxin of Edema Disease of Swine

SPECIAL RESEARCH GRANTS PROGRAM
PROGRAM AREA: ANIMAL HEALTH RESEARCH

GRANTS AWARDED FOR FISCAL YEAR 1984

ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT FROM	PERIOD TO	TITLE
Cornell Univ. Ithaca, New York 14853	N. Scott	\$60,000	08/15/84	08/31/86	Biomechanics of Dairy Cow's Teat Related to Mastitis and Machine Milking
NC Agric. Res. Service North Carolina State Univ. Raleigh, North Carolina 27695	G. Dial	\$50,658	07/01/84	06/30/86	Seasonal Postweaning Anestrus: Hypothalamic and Pituitary Function of the Anestrous Sow
Ohio State Univ. Res. Fdn. Columbus, Ohio 43212	Yehia Saif	\$117,898	09/15/84	09/30/87	Characterization and Epizooti- ology of Serotype II Infect- ious Bursal Disease Virus
Ohio State Univ. Res. Fdn. Columbus, Ohio 43212	K. Theil	\$90,741	09/15/84	09/30/87	Enteritis in Turkey Poults: The Role of Rotaviruses and Rotavirus-like Viruses
Agric. Expt. Station Univ. of Tennessee Knoxville, Tennessee 37901	Robert Walker	\$149,817	09/15/84	09/30/87	Antibody Response in the Bovine Lower Respiratory Tract to Inhaled <u>Pasteurella</u> <u>hemolytica</u>
Agric. Expt. Station Univ. of Tennessee Knoxville, Tennessee 37901	Arthur Brown	\$148,201	09/15/84	09/30/87	An Infected Cell Membrane Protein as a Cross Protective Vaccine for Alphaviruses

SPECIAL RESEARCH GRANTS PROGRAM
PROGRAM AREA: ANIMAL HEALTH RESEARCH

GRANTS AWARDED FOR FISCAL YEAR 1984

ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Texas A&M Res. Fdn. College Station, Texas 77843	Timothy Phillips	\$94,482	09/01/84 08/31/87	Mechanistic Studies of Ochratoxin A and Citrinin Induced Nephropathy in Swine
Texas A&M Research Fdn. College Station, Texas 77843	T. Ficht	\$149,467	09/01/84 08/31/87	Cloning and Expression of Protective Immunogen Genes of <u>Brucella abortus</u>
Virginia Polytechnic Inst. & State Univ. Blacksburg, Virginia 24061	Craig Hammerberg	\$101,439	07/01/84 06/30/87	Biological Enhancement of Resistance to Enteric and Respiratory Diseases in Piglets
Virginia Polytechnic Inst. & State Univ. Blacksburg, Virginia 24061	Gerhardt Schurig	\$100,000	09/15/84 09/30/86	<u>Brucella abortus</u> Antigen Expression: Understanding and Applications
Washington State Univ. Pullman, Washington 99164	R. Breeze	\$96,186	09/01/84 02/28/86	A Vaccinia Virus Recombinant Amplification System for Bovine Viral Subunit Vaccines
Washington State Univ. Pullman, Washington 99164	Lynette Corbeil	\$149,677	09/15/84 09/30/87	Reproductive Infections with <u>Haemophilus somnus</u> : Diagnosis and Immunity
Washington State Univ. Pullman, Washington 99164	W. Cheevers	\$77,145	07/15/84 07/31/86	Development of Diagnostic Reagents for Sheep and Goat Retroviruses

SPECIAL RESEARCH GRANTS PROGRAM
PROGRAM AREA: ANIMAL HEALTH RESEARCH

GRANTS AWARDED FOR FISCAL YEAR 1984

ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT FROM	PERIOD TO	TITLE
Washington State Univ. Pullman, Washington 99164	H. Liggitt	\$149,145	09/15/84	09/30/86	Mechanisms of Virus-induced Suppression of Bovine Lung Mucosal Defense
Washington State Univ. Pullman, Washington 99164	T. McGuire	\$64,999	07/15/84	07/31/86	Protection Against Equine Infectious Anemia by Immuniza- tion with a Synthetic Peptide
Washington State Univ. Pullman, Washington 99164	J. Magnuson	\$149,939	09/01/84	08/31/87	Molecular Cloning of the cDNA Gene for Bovine Interleukin-2
Washington State Univ. Pullman, Washington 99164	W. Davis	\$98,851	09/01/84	08/31/86	Production of Protective Monoclonal Antibodies in Pigs by Transfection with DNA
Washington State Univ. Pullman, Washington 99164	R. Leid	\$112,494	**09/01/82	**08/31/86	Isolation and Cloning of Protective Juvenile <u>Fasciola</u> <u>hepatica</u> Surface Antigens
Univ. of Wisconsin Madison, Wisconsin 53706	Michael Collins	\$47,908	09/15/84	09/30/86	Rapid Detection of <u>Mycobacterium</u> <u>paratuberculosis</u> Using Radiometric Techniques
Univ. of Wisconsin Madison, Wisconsin 53706	R. Hanson	\$50,000	09/01/84	08/31/86	Vesicular Stomatitis Virus: A Molecular Biological Study of the 1982-83 Epizootic

**AMENDMENT

SPECIAL RESEARCH GRANTS PROGRAM
PROGRAM AREA: ANIMAL HEALTH RESEARCH

GRANTS AWARDED FOR FISCAL YEAR 1984

ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT FROM	PERIOD TO	TITLE
Univ. of Wisconsin Madison, Wisconsin 53706	Oliver Ginther	\$98,905	09/15/84	09/30/86	Evaluation of the Bovine Reproductive Tract by Real- Time Ultrasound
Univ. of Wisconsin Madison, Wisconsin 53706	Gary Splitter	\$150,000	09/15/84	09/30/86	T-lymphocytes Function Against IBR Virus
Univ. of Wisconsin Madison, Wisconsin 53706	Charles Czuprynski	\$139,647	09/15/84	09/30/87	Bovine Phagocyte Interaction with IBR Virus, <u>Pasteurella</u> , and <u>Haemophilus</u>
Univ. of Wisconsin Madison, Wisconsin 53706	Ronald Schultz	\$99,148	09/15/84	09/30/87	Effects of Feeding Aflatoxins to Sows on Disease Susceptibility in Young Pigs
Univ. of Wisconsin Madison, Wisconsin 53706	Geoffrey Letchworth	\$150,000	07/01/84	06/30/87	Potential for Vaccine-Induced Antigenic Variation in Bovid Herpesvirus 1

TOTAL \$6,899,672

Aquaculture

This purpose of this program area is to provide and/or improve upon the scientific and technical base needed by the aquaculture industry. This industry has been expanding rapidly. Problems of nutrition, breeding, physiology, management, disease and parasite control are important and are becoming more limiting as the size of the industry and its concentration have increased.

Interest is focused on local and regional problems for which solutions will contribute to national objectives related to aquaculture production.

The specific objectives of the research are: (1) improved production efficiency through diet formulation, reproduction and breeding, and disease and parasite control; (2) improved water quality for production and control of factors affecting the quality of water discharge; and (3) increased production of freshwater species having high production potential such as catfish, trout, bait minnows, and crawfish.

SPECIAL RESEARCH GRANTS PROGRAM
PROGRAM AREA: AQUACULTURE RESEARCH

GRANTS AWARDED FOR FISCAL YEAR 1984

ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT FROM	PERIOD TO	TITLE
Univ. of California Davis, California 95616	Graham Gall	\$78,540	09/01/84	08/31/87	Age at Sexual Maturity and Growth Rate of Rainbow Trout
Univ. of Georgia Res. Fdn. Athens, Georgia 30602	Emmett Shotts	\$78,975	07/01/84	06/30/86	Pathogenesis Mechanisms of <u>Edwardsiella ictaluri</u>
Louisiana State Univ. Baton Rouge, Louisiana 70803	James Avault	\$67,092	09/15/84	09/30/86	A Practical Scheme for the Farming of Prawns in the Southeastern United States
Louisiana State Univ. Baton Rouge, Louisiana 70803	Ronald Thune	\$69,104	09/01/84	08/31/87	Virulence Factors of <u>Aeromonas hydrophila</u> : Their Role in Pathogenicity and Potential as Immunogens
Univ. of Mississippi Med. Center Jackson, Mississippi 39216-4505	Lester Clem	\$31,154*	09/15/84	09/30/86	Immunodiagnostic and Preventive Procedures with Channel Catfish

*\$48,846 also provided from Animal Health Research program area.
This grant was awarded in the amount of \$80,000

SPECIAL RESEARCH GRANTS PROGRAM
PROGRAM AREA: AQUACULTURE RESEARCH

GRANTS AWARDED FOR FISCAL YEAR 1984

ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Univ. of Mississippi Univ., Mississippi 38677	Craig Busack	\$56,806	08/15/84 08/31/86	Genetic Variability Among Stocks of Red Swamp Crawfish, <u>Procambarus</u> <u>clarkii</u>
Texas A&M Res. Fdn. College Station, Texas 77843	Gunnar Finne	\$41,675	09/01/84 08/31/85	Improvement in the Texture and Flavor of Freshwater Shrimp (<u>Macrobrachium</u> <u>rosenbergii</u>)
Washington State Univ. Pullman, Washington 99164	Gary Thorgaard	\$76,099**	**09/15/82 **08/31/86	Applications of All-Paternal Inheritance in Rainbow Trout

TOTAL \$499,445

**AMENDMENT

Soybean Research

The objective of this research is to increase soybean productivity and conserve natural resources. Two areas of research are funded under this topic: (1) soybean production research to sustain or increase yields, enhance production efficiency, and conserve natural resources; and (2) research on soybean genetic mechanisms contributing to tolerance to biotic and abiotic stress.

Soybean acreage in the U.S. is exceeded only by corn. Farmers receive more dollars from soybean sales than any other crop, and the export of soybeans contributes more to the U.S. balance of trade than any other agricultural commodity. Edible soybean oil provides the raw material for a diversity of food and industrial uses. The high-protein meal provides an indispensable feed for animals: two-thirds of all high-protein feed for livestock and poultry is soybean meal. This program of research grants is aimed at identifying factors limiting further production increases from this versatile crop. Once limiting factors are identified, techniques can be developed to alleviate the problem. Past increases in productivity have been significant--with an average per-acre per-year increase of 0.4 bushels over the past 30 years. The desire is to continue to increase the productivity of soybeans.

SPECIAL RESEARCH GRANTS PROGRAM
PROGRAM AREA: SOYBEAN RESEARCH

GRANTS AWARDED FOR FISCAL YEAR 1984

ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT FROM	PERIOD TO	TITLE
Stanford Univ. Stanford, California 94305	Eduardo Zeiger	\$100,000	09/15/84	09/30/86	Stomatal Regulation in Soybean: Mechanisms and Application to Crop Improvement
Iowa State Univ. of Sci. & Techn. Ames, Iowa 50011	R. Palmer	\$55,061	09/01/84	08/31/87	Relation of Isozyme Loci to Qualitative Characters of Soybean
Univ. of Missouri Columbia, Missouri 65211	George Wagner	\$94,631**	**09/01/83	**08/31/86	Soybean Production and Soil Organic Matter Balance
NC Agric. Res. Service North Carolina State Univ. Raleigh, North Carolina 27695-7601	J. Miksche	\$90,825	08/01/84	07/31/87	Molecular Studies of DNA Changes During Soybean Cotyledon Senescence
Ohio State Univ. Res. Fdn. Columbus, Ohio 43212	Steven St. Martin	\$61,220	08/01/84	07/31/87	Inheritance of Antibiosis Resistance to Mexican Bean Beetle in Soybeans
Washington State Univ. Pullman, Washington 99164	V. Franceschi	\$97,708	08/15/84	08/31/86	Ureide Metabolism in Mesophyll and Paraveinal Mesophyll Cells of Soybean Leaf
	TOTAL	\$499,445			

**AMENDMENT

ALCOHOL FUELS RESEARCH GRANTS PROGRAM

This program is administered under the authority of Section 1419 of Public Law 95-113, as amended, which authorizes grants for research in the areas of alcohols and industrial hydrocarbons from agricultural commodities and forest products and agricultural chemicals and other products and coal derivatives. The total amount available for this program during Fiscal Year 1984 was \$520,657.

The Alcohol program funds are intended to stimulate and support energy-related research. This includes research on the evaluation (including economic), treatment, and conversion of biomass for manufacture of alcohol. Such research is national in scope, is not designed to meet the needs or address the problems of a particular State, area or locality, does not include demonstration or pilot research projects, and does not involve capital construction. Eligible institutions include colleges, universities, Government corporations and Federal laboratories. A list of the research grants awarded in Fiscal Year 1984 follows.

ALCOHOL FUELS RESEARCH GRANTS PROGRAM
PROGRAM AREA: ALCOHOL RESEARCH

GRANTS AWARDED FOR FISCAL YEAR 1984

ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT FROM	PERIOD TO	TITLE
Univ. of Colorado Campus Box B19 Boulder, Colorado 80309	W. Krantz	\$80,000	09/15/84	09/30/86	Novel Membrane Concentration of Ethanol Solutions Produced from Biomass
Colorado State Univ. Ft. Collins, Colorado 80523	James Linden	\$79,552	09/15/84	12/31/85	Simultaneous Storage of Ferment- ables and Hydrolysis of Lignocellulosics During Ensiling
Purdue Research Fdn. West Lafayette, Indiana 47907	Michael Ladisch	\$80,000	09/01/84	08/31/86	Acid Separation and Recycle from Cellulose Hydrolysate by Ion Exchange Chromatography
Massachusetts Inst. of Technology Cambridge, Massachusetts 02139	A. Sinskey	\$79,869	09/01/84	08/31/86	Expression of <u>Escherichia</u> <u>coli</u> Xylose Isomerase Gene in <u>Saccharomyces cerevisiae</u>
Michigan State Univ. East Lansing, Michigan 48824	Martin Hawley	\$79,954	09/15/84	09/30/86	Gas Phase HF Saccharification of Lignocellulosic Materials
Lehigh Univ. Bethlehem, Pennsylvania 18015	Bland Montenecourt	\$80,000	08/01/84	07/31/86	Bacterial Production of Acrylic Acid Cheese Whey
Forest Products Lab. Forest Service, USDA P.O. Box 5130 Madison, Wisconsin 53705	Thomas Jeffries	\$41,282	09/01/84	08/31/86	Fermentation of D-xylose by <u>Candida shehatae</u>

TOTAL \$520,657

FOOD AND AGRICULTURAL SCIENCES NATIONAL NEEDS GRADUATE
FELLOWSHIPS GRANT PROGRAM

This program was initiated because of increasing concern about growing shortages of trained professionals in the food and agricultural sciences. The objective of the program is to encourage outstanding students (U.S. citizens) to pursue and complete a graduate degree in an area of the food and agricultural sciences for which there is a national need for the development of scientific expertise. The FY 1984 program consisted of competitive grants to colleges and universities with superior graduate teaching and research programs in the targeted areas of the food and agricultural sciences. Fellowships were awarded in the following areas in FY 1984:

Agricultural Engineering	\$1,123,731
Biotechnology	1,527,730
Food and Agricultural Marketing	1,075,481
Food Science/Human Nutrition	1,123,058
	<u>\$4,850,000</u>

This program is administered under the authority of Section 1417(a)(3)(B) of P.L. 95-113, as amended (7 U.S.C. 3103). Eligible institutions include all U.S. colleges and universities which confer a Master's or doctoral degree in an area of the food and agricultural sciences targeted for national needs fellowships.

GRADUATE FELLOWSHIP PROGRAM
PROGRAM AREA: AGRICULTURAL ENGINEERING

GRANTS AWARDED FOR FISCAL YEAR 1984

ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT FROM	PERIOD TO	FELLOWSHIPS SUPPORTED
Univ. of Arizona Tucson, Arizona 95721	W. Matlock	\$12,458	09/15/84	09/30/86	1 Master's
Colorado State Univ. Ft. Collins, Colorado 80523	D. McWhorter	\$102,824	09/15/84	09/30/86	6 Doctoral
Univ. of Florida Gainesville, Florida 32611	D. Buffington	\$60,000	09/15/84	09/30/86	4 Doctoral
Univ. of Hawaii--Manoa Honolulu, Hawaii 96822	D. Singh	\$10,982	09/15/84	09/30/86	1 Master's
Univ. of Illinois Champaign, Illinois 61820	William George	\$90,000*	09/15/84	09/30/86	2 Doctoral
Purdue Univ. West Lafayette, Indiana 47907	E. Monke	\$71,184	09/15/84	09/30/86	4 Doctoral
Iowa State Univ. of Science & Technology Ames, Iowa 50011	T. Austin	\$154,500	09/15/84	09/30/86	10 Doctoral

*Also includes support for fellowships in the following
National Needs area: Agricultural Engineering

GRADUATE FELLOWSHIP PROGRAM
PROGRAM AREA: AGRICULTURAL ENGINEERING

GRANTS AWARDED FOR FISCAL YEAR 1984

ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT FROM	PERIOD TO	FELLOWSHIPS SUPPORTED
Univ. of Maryland College Park, Maryland 20742	Fred Wheaton	\$106,557	09/15/84	09/30/86	5 Doctoral/2 Master's
Univ. of Nebraska Lincoln, Nebraska 68588	W. Splinter	\$99,228	09/15/84	09/30/86	6 Doctoral
North Carolina State Univ. Raleigh, North Carolina 27695	R. Skaggs	\$63,332	09/15/84	09/30/86	4 Doctoral
Ohio State Univ. Res. Fdn. Columbus, Ohio 43212	Warren Roller	\$10,440	09/15/84	09/30/86	1 Master's
Oklahoma State Univ. Stillwater, Oklahoma 74078	Charles Haan	\$95,000	09/15/84	09/30/86	6 Doctoral
Oregon State Univ. Corvallis, Oregon 97331	R. Cuenca	\$34,590	09/15/84	09/30/86	3 Master's

GRADUATE FELLOWSHIP PROGRAM
PROGRAM AREA: AGRICULTURAL ENGINEERING

GRANTS AWARDED FOR FISCAL YEAR 1984

ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT FROM	PERIOD TO	FELLOWSHIPS SUPPORTED
Pennsylvania State Univ. Univ. Park, Penn. 16802	A. Kilara	\$64,115**	09/15/84	09/30/86	3 Master's
Clemson Univ. Clemson, South Carolina 29631	B. Webb	\$17,800	09/15/84	09/30/86	1 Doctoral
South Dakota State Univ. Brookings, South Dakota 57007	Mylo Hellickson	\$43,800	09/15/84	09/30/86	4 Master's
Texas A&M Univ. College Station, Texas 77843	E. Hiler	\$78,530	09/15/84	09/30/86	5 Doctoral
Virginia Polytechnic Inst. & State Univ. Blacksburg, Virginia 24061	C. Haugh	\$45,333	09/15/84	09/30/86	4 Master's
Univ. of Wyoming Laramie, Wyoming 82071	J. Smith	\$55,116	09/15/84	09/30/86	4 Master's

TOTAL \$1,123,731***

**Also includes support for fellowships in the following
National Needs area(s): Food Science/Human Nutrition

***Individual amounts do not add up to the "Total" because
some amounts support more than one National Needs area.

GRADUATE FELLOWSHIP PROGRAM
PROGRAM AREA: BIOTECHNOLOGY

GRANTS AWARDED FOR FISCAL YEAR 1984

ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT FROM	PERIOD TO	FELLOWSHIPS SUPPORTED
Univ. of California Berkeley, California 94720	R. Jones	\$82,680	09/15/84	09/30/86	5 Doctoral
Univ. of California Los Angeles, California 90024	J. Thornber	\$81,990	09/15/84	09/30/86	5 Doctoral
Univ. of California Riverside, California 92521	J. Leary	\$120,000	09/15/84	09/30/86	8 Doctoral
Stanford Univ. Stanford, California 94305	H. Mooney	\$103,989	09/15/84	09/30/86	6 Doctoral
Colorado State Univ. Ft. Collins, Colorado 80523	G. Niswender	\$83,468	09/15/84	09/30/86	4 Doctoral
Univ. of Chicago Chicago, Illinois 60637	L. Mets	\$102,551	09/15/84	09/30/86	5 Doctoral
Univ. of Illinois Urbana, Illinois 61801	J. Shaddock	\$93,413	09/15/84	09/30/86	6 Doctoral

GRADUATE FELLOWSHIP PROGRAM
PROGRAM AREA: BIOTECHNOLOGY

GRANTS AWARDED FOR FISCAL YEAR 1984

ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT FROM	PERIOD TO	FELLOWSHIPS SUPPORTED
Purdue Univ. West Lafayette, Indiana 47907	B. Baumgardt	\$95,898	09/15/84	09/30/86	6 Doctoral
Univ. of Iowa Iowa City, Iowa 52242	John Butler	\$104,994	09/15/84	09/30/86	6 Doctoral
Massachusetts Inst. of Technology Cambridge, Massachusetts 02139	M. Karel	\$101,284	09/15/84	09/30/86	5 Doctoral
Michigan State Univ. East Lansing, Michigan 48824	K. Nadler	\$101,649	09/15/84	09/30/86	5 Doctoral
Univ. of Minnesota St. Paul, Minnesota 55108	B. Gengenbach	\$63,161	09/15/84	09/30/86	4 Doctoral
Univ. of Missouri Columbia, Missouri 65211	Douglas Randall	\$137,211	09/15/84	09/30/86	8 Doctoral

GRADUATE FELLOWSHIP PROGRAM
PROGRAM AREA: BIOTECHNOLOGY

GRANTS AWARDED FOR FISCAL YEAR 1984

ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT PERIOD FROM TO	FELLOWSHIPS SUPPORTED
Univ. of Missouri Columbia, Missouri 65211	J. Berg	\$49,611	09/15/84 09/30/86	3 Doctoral
Cornell Univ. Ithaca, New York 14853	R. Turgeon	\$95,000	09/15/84 09/30/86	6 Doctoral
Texas A&M Univ. College Station, Texas 78443	T. Baldwin	\$110,831	09/15/84 09/30/86	7 Doctoral
TOTAL		\$1,527,730		

GRADUATE FELLOWSHIP PROGRAM
PROGRAM AREA: FOOD & AGRICULTURAL MARKETING

GRANTS AWARDED FOR FISCAL YEAR 1984

ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT FROM	PERIOD TO	FELLOWSHIPS SUPPORTED
Auburn Univ. Auburn Univ., Alabama 36849	G. Sullivan	\$37,939	09/15/84	09/30/86	2 Doctoral
Univ. of California Berkeley, California 94720	S. Robinson	\$60,538	09/15/84	09/30/86	4 Doctoral
Univ. of California Berkeley, California 94720	D. Teegarden	\$45,405	09/15/84	09/30/86	3 Doctoral
Univ. of California Davis, California 95616	Warren Johnston	\$60,324	09/15/84	09/30/86	4 Doctoral
Univ. of Florida Gainesville, Florida 32611	J. Shonkwiler	\$127,600*	09/15/84	09/30/86	4 Doctoral

*Also includes support for fellowships in the
following National Needs area(s): Food Science/Human Nutrition

GRADUATE FELLOWSHIP PROGRAM
PROGRAM AREA: FOOD & AGRICULTURAL MARKETING

GRANTS AWARDED FOR FISCAL YEAR 1984

ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT FROM	PERIOD TO	FELLOWSHIPS SUPPORTED
Univ. of Illinois Champaign, Illinois 61820	William George	\$90,000*	09/15/84	09/30/86	4 Doctoral
Univ. of Maryland College Park, Maryland 20742	Rachel Dardis	\$70,503	09/15/84	09/30/86	4 Doctoral
Michigan State Univ. East Lansing, Michigan 48824	H. Riley	\$51,834	09/15/84	09/30/86	3 Doctoral
Univ. of Minnesota St. Paul, Minnesota 55108	J. Hammond	\$93,945	09/15/84	09/30/86	5 Doctoral
North Carolina State Univ. Raleigh, North Carolina 27695	R. Perrin	\$79,165	09/15/84	09/30/86	5 Doctoral
Ohio State Univ. Res. Fdn. Columbus, Ohio 43212	Joseph Havlicek	\$100,968	09/15/84	09/30/86	6 Doctoral

*Also includes support for fellowships in the following
National Needs area: Agricultural Engineering

GRADUATE FELLOWSHIP PROGRAM
PROGRAM AREA: FOOD & AGRICULTURAL MARKETING

GRANTS AWARDED FOR FISCAL YEAR 1984

ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT PERIOD FROM TO	FELLOWSHIPS SUPPORTED
Oklahoma State Univ. Stillwater, Oklahoma 74078	Daniel Tilley	\$80,450	09/15/84 09/30/86	5 Doctoral
Univ. of Rhode Island Kingston, Rhode Island 02881	T. Weaver	\$48,830	09/15/84 09/30/86	3 Doctoral
Texas Tech Univ. Lubbock, Texas 79409	R. Albin	\$69,248	09/15/84 09/30/86	4 Doctoral
Washington State Univ. Pullman, Washington 99164	LeRoy Rogers	\$60,000	09/15/84 09/30/86	4 Doctoral
Univ. of Wisconsin Madison, Wisconsin 53706	D. Bromley	\$93,432	09/15/84 09/30/86	6 Doctoral

TOTAL \$1,075,481***

**Individual amounts do not add up to the "Total"
because some amounts support more than one National Needs Area

GRADUATE FELLOWSHIP PROGRAM
PROGRAM AREA: FOOD SCIENCE/HUMAN NUTRITION

GRANTS AWARDED FOR FISCAL YEAR 1984

ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT FROM	PERIOD TO	FELLOWSHIPS SUPPORTED
Alabama A&M Univ. Normal, Alabama 35762	G. Sunki	\$48,064	09/15/84	09/30/86	4 Master's
Tuskegee Institute Tuskegee Inst., Alabama 36088	G. Cooper	\$46,350	09/15/84	09/30/86	3 Master's
Univ. of Arizona Tucson, Arizona 85721	D. Goll	\$10,779	09/15/84	09/30/86	1 Master's
Univ. of California Davis, California 95616	R. Rucker	\$128,095	09/15/84	09/30/86	8 Doctoral
Univ. of Southern California Los Angeles, California 90089	S. Bessman	\$130,415	09/15/84	09/30/86	4 Doctoral
Univ. of Connecticut Storrs, Connecticut 06268	K. Knox	\$80,000	09/15/84	09/30/86	5 Doctoral
Univ. of Florida Gainesville, Florida 32611	J. Shonkwiler	\$127,600*	09/15/84	09/30/86	4 Doctoral

*Also includes support for fellowships in the following
National Needs area: Food & Agricultural Marketing

GRADUATE FELLOWSHIP PROGRAM
PROGRAM AREA: FOOD SCIENCE/HUMAN NUTRITION

GRANTS AWARDED FOR FISCAL YEAR 1984

ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT PERIOD FROM TO	FELLOWSHIPS SUPPORTED
Univ. of Georgia Athens, Georgia 30602	Carolyn Berdanier	\$75,048	09/15/84 09/30/86	4 Doctoral
Kansas State Univ. Manhattan, Kansas 66506	D. Fung	\$93,394	09/15/84 09/30/86	6 Doctoral
Univ. of Massachusetts Amherst, Massachusetts 01003	R. Brown	\$78,483	09/15/84 09/30/86	5 Doctoral
Tufts Univ. Boston, Massachusetts 02111	Stanley Gershoff	\$93,720	09/15/84 09/30/86	6 Doctoral
Michigan State Univ. East Lansing, Michigan 48824	T. Dutson	\$30,000	09/15/84 09/30/86	2 Doctoral
Univ. of Minnesota St. Paul, Minnesota 55108	E. Caldwell	\$31,923	09/15/84 09/30/86	3 Master's

GRADUATE FELLOWSHIP PROGRAM
PROGRAM AREA: FOOD SCIENCE/HUMAN NUTRITION

GRANTS AWARDED FOR FISCAL YEAR 1984

ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT FROM	PERIOD TO	FELLOWSHIPS SUPPORTED
Mississippi State Univ. Ms. State, Mississippi 39762	G. Ammerman	\$40,346	09/15/84	09/30/86	1 Doctoral/2 Master's
Univ. of Nebraska Lincoln, Nebraska 68583	R. Wehling	\$11,701	09/15/84	09/30/86	1 Master's
Cornell Univ. Ithaca, New York 14853	M. Nesheim	\$95,000	09/15/84	09/30/86	6 Doctoral
Pennsylvania State Univ. Univ. Park, Pennsylvania 16802	A. Kilara	\$64,115*	09/15/84	09/30/86	3 Master's
Univ. of Tennessee Knoxville, Tennessee 37901	J. Miles	\$21,546	09/15/84	09/30/86	2 Master's
Utah State Univ. Logan, Utah 84322	Jeffrey Kondo	\$11,436	09/15/84	09/30/86	1 Master's

TOTAL \$1,123,058**

*Also includes support for fellowships in the
following National Needs area: Agricultural Engineering.

**Individual amounts do not add up to the "Total" because some
amounts support more than one National Needs area.

SMALL BUSINESS INNOVATION RESEARCH PROGRAM

The objectives of this program are to stimulate technological innovation in the private sector, to strengthen the role of small business in meeting Federal research and development needs, to increase private sector commercialization and development efforts, and to encourage participation of small and disadvantaged firms in technological innovation.

The program emphasizes support of high-quality research and development proposals containing advanced concepts related to important agricultural problems and opportunities that could lead to significant public benefits. The areas considered in this program are broad and encompass a wide range of agricultural sciences. The subtopics include: (1) air, water and soils, (2) animal production and protection, (3) food science and nutrition, (4) forests and related resources, (5) plant production and protection, and (6) rural and community development.

In Fiscal Year 1984, USDA awarded both Phase I and Phase II grants. Phase I grants are primarily for research designed to determine technical feasibility of the proposed approach or concept. Phase II grants are awarded to those Phase I projects that have shown sufficient promise for further support.

SMALL BUSINESS INNOVATION RESEARCH PROGRAM
PROGRAM AREA: AIR, WATER & SOILS

GRANTS AWARDED FOR FISCAL YEAR 1984

ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Agricultural Instrument Systems Corp. 4020 E. Coronado Dr. Tucson, Arizona 85718	William Gensler	\$45,000	09/15/84 05/31/85	An Instrumentation System for Determining a Crop Water Status Index
Mickley and Associates 752 Gapter Road Boulder, Colorado 80303	Michael Mickley	\$49,682	09/15/84 03/31/85	Charged Ultrafiltration Membrane Demineralization of Saline Waters for Irrigation
Kamterter, Inc. P.O. Box 30327 Lincoln, Nebraska 68503	John Eastin	\$43,506	09/15/84 03/31/85	Facilitating the Colonization of Plant Roots by Beneficial Microorganisms

TOTAL \$138,188

SMALL BUSINESS INNOVATION RESEARCH PROGRAM
PROGRAM AREA: ANIMAL PRODUCTION & PROTECTION

GRANTS AWARDED FOR FISCAL YEAR 1984

ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT FROM	PERIOD TO	TITLE
Aquatic Systems, Inc. 11125 Flintkote Ave. Suite J San Diego, California 92121	Jon Van Olst	\$35,000	09/15/84	03/31/85	Control of Water Quality in Intensive Geothermal Fish Culture
Innovative Technology, Inc. Box 10072 Southern Station Hattiesburg, Mississippi 39406-0072	W. Douglas	\$100,000	09/01/84	08/31/85	Development of a Dry Film Assay for the Rapid Detection of Trichinosis in Swine
BioMetallics, Inc. P.O. Box 1264 Princeton, New Jersey 08542	Christa Kuehn	\$120,000	09/01/84	08/31/85	Progesterone Enzyme Immunoassay for Early Pregnancy Diagnosis in Farm Animals
Embryogen, Inc. 1 President St. Athens, Ohio 45701	Finnie Murray	\$48,462	09/15/8	03/31/85	Interferon Recombinant Livestock
TOTAL		\$303,462			

SMALL BUSINESS INNOVATION RESEARCH PROGRAM
PROGRAM AREA: FOOD SCIENCE & NUTRITION

GRANTS AWARDED FOR FISCAL YEAR 1984

ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Hawaii Biotechnology Group, Inc. P.O.Box 1057 Aiea, Hawaii 96701	Douglas Vann	\$42,000	09/15/84 03/31/85	Rapid Detection of Carbofuran in Food and Environmental Samples
Genetic Diagnostics Corporation 160 Community Drive Great Neck, New York 11021	Harvey Brandwein	\$180,000	09/01/84 08/31/86	Monoclonal Antibodies and Immunoassay for T-2 Toxin
American Research Corp. of Virginia 642 First St. P.O. Box 3406 Radford, Virginia 24143-3406	Russell Churchill	\$49,000	09/15/84 03/31/85	Laser Diagnostics of Microbial Populations in Food Processing Systems

TOTAL \$271,000

SMALL BUSINESS INNOVATION RESEARCH PROGRAM
PROGRAM AREA: FORESTS & RELATED RESOURCES

GRANTS AWARDED FOR FISCAL YEAR 1984

ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT FROM	PERIOD TO	TITLE
Engineering Data Management, Inc. P.O. Box 1774 Ft. Collins, Colorado 80522	G. Brent Fagan	\$47,461	09/15/84	03/31/85	Reliable Strength Assessment of Wood Composites
Resin Research Laboratories, Inc. 26 Avenue B Newark, New Jersey 07114	Pascal Esemplare	\$18,508	09/15/84	03/31/85	Evaluation of Oleoresinous Fraction from Guayule Plants
Native Plants, Inc. 417 Wakara Way Salt Lake City, Utah 84108	T. Wood	\$100,000	09/01/84	08/31/86	An Inoculated Transfer Plug for Mass Production of Tissue Culture Trees
Efficient Machinery Company 220 111th Ave, S.E. Bellevue, Washington 98004	Peter Hammerschlag	\$45,000	09/15/84	03/31/85	Systematic Analysis of Central Passage Circular Sawing Process

TOTAL \$210,969

SMALL BUSINESS INNOVATION RESEARCH GRANTS PROGRAM
PROGRAM AREA: PLANT PRODUCTION & PROTECTION

GRANTS AWARDED FOR FISCAL YEAR 1984

ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT FROM	PERIOD TO	TITLE
Odetics, Inc. 1515 N. Manchester Ave. Anaheim, California 92805	Stephen Bartholet	\$43,506	09/15/84	03/31/85	Automated Citrus Fruit Harvester
Beard Industries, Inc. RR #6, Box 19 Frankfort, Indiana 46041	E. Williams	\$200,000	09/01/84	08/31/86	Engine-powered High-temperature Heat Pump Grain Dryer
Photics, Inc. 98 Old Lowell Road Westford, Massachusetts 01886	Rudolph Bradbury	\$45,000	09/15/84	03/31/85	Holographic Sunlight Distribution for High-efficiency Greenhouses
Bio-Metric Systems, Inc. 9932 West 74th St. Eden Prairie, Minnesota 55344	Patrick Guire	\$49,932	09/15/84	03/31/85	Enzyme Immunoassay Technology and Paper Assay Kits for Plant Pathogens
Congdon & Weller Wholesale Nurs., Inc. Mile Block Road North Collins, New York 14111	Catherine Klein-Cox	\$28,087	09/15/84	03/31/85	Laboratory Cloning of Virus-tested Raspberry Plants
Oglevee Assoc., Inc. 150 Oglevee Lane Connellsville, Penn. 15425-3888	J. Oglevee	\$200,000	09/01/84	08/31/86	Model Development for Computerized Plant Environmental Growth Strategies
TOTAL		\$566,525			

SMALL BUSINESS INNOVATION RESEARCH PROGRAM
PROGRAM AREA: RURAL & COMMUNITY DEVELOPMENT

GRANTS AWARDED FOR FISCAL YEAR 1984

ORGANIZATION	PRINCIPAL INVESTIGATOR	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
ELRA Group P.O. Box 15610 San Francisco, Calif. 94115	Robert LaRose	\$49,148	09/15/84 03/31/85	The Impact of Telecommunication Delivery Systems on Agriculture
DUAL-Comm, Inc. 1015 Fifteenth St., NW Suite 1250 Washington, D.C. 20005	John Beresford	\$44,000	09/15/84 03/31/85	Current Economic and Demographic Estimates for Counties (CEDEC)
Missouri IncuTech, Inc. Route 4, Box 519 Rolla, Missouri 65401	M. Alison Buck	\$100,000	09/01/84 08/31/85	Development of the High-tech Incubator Concept for a Rural/University Setting
TOTAL		\$193,148		

SCIENTISTS WHO SERVED ON USDA/S&E PEER REVIEW PANELS FOR FISCAL YEAR 1984

Scientists from government, universities, and industry served on USDA/S&E peer review panels this past year. Each panel was put together to fit the expertises needed for that specific granting area. The scientists involved are listed below alphabetically within their respective States.

ALABAMA

Phillip C. Badger
Tennessee Valley Authority

Virginia Caples
Alabama A&M University

George Cooper
Tuskegee Institute

James D. Harper
Auburn University

John A. Plumb
Auburn University

Paul C. Smith
Auburn University

ARIZONA

James W. O'Leary
University of Arizona

John W. Radin
ARS-USDA

ARKANSAS

Charles E. Caviness
University of Arkansas

CALIFORNIA

Sean S. Duffey
University of California-Davis

John M. Duniway
University of California-Davis

Mary K. Firestone
University of California-Berkeley

Graham A. E. Gall
University of California-Davis

Anthony E. Hall
University of California-Riverside

J. P. Hughes
University of California-Davis

Christopher Lamb
The Salk Institute for
Biological Studies

Sharon R. Long
Stanford University

Kenneth H. Sauer
University of California-Berkeley

CALIFORNIA--continued

Barbara O. Schneeman
University of California-Davis

Marian E. Swendseid
University of California
School of Public Health

William C. Taylor
University of California-Berkeley

William F. Thompson
Carnegie Institute of Washington

William E. Timberlake
University of California-Davis

Charles West
University of California-
Los Angeles

COLORADO

G. Richard Jansen
Colorado State University

Marvin Jensen
ARS-USDA

L. D. Pearson
Colorado State University

CONNECTICUT

R. J. Aldrich
University of Connecticut

Sandra L. Anagnostakis
Connecticut Agricultural
Experiment Station

John P. H. Brand
University of Connecticut

J. Daniel Hare
Connecticut Agricultural
Experiment Station

DELAWARE

J. K. Rosenberger
University of Delaware

Klaus Saegebarth
E. I. du Pont de Nemours & Co.

DISTRICT OF COLUMBIA

Jack H. Armstrong
ACS-USDA

Clarence Becker
CSRS-USDA

Mary Clutter
National Science Foundation

Melvin L. Cotner
ERS-USDA

DISTRICT OF COLUMBIA--continued

Benson Drucker
National Oceanic and Atmospheric
Administration, USDC

Gene Mathia
ERS-USDA

McKinley Mayes
CSRS-USDA

Earl Splitter
CSRS-USDA

William E. Tallent
ARS-USDA

Eldon Weeks
CSRS-USDA

FLORIDA

Jesse F. Gregory III
University of Florida

J. P. Lawman
University of Florida

James L. Nation
University of Florida

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